

BENJAMIN'S
American Hand Book
OF
CHEMICAL & PHYSICAL
APPARATUS.

WARSHAW COLLECTION

Specializing in the Lore of American Business
Industry and the Professions.

ALBANY, N. Y.

CLASS.....

NO.....

51775

AMERICAN
H A N D - B O O K

OF

Chemical & Physical Apparatus,

MINERALS, FOSSILS, RARE CHEMICALS, etc.,

FOR THE USE OF

Schools, Colleges, Factories,

HOSPITALS, LABORATORIES, ASSAYERS, DENTISTS, PERFUMERS,
CHEMISTS, DRUGGISTS, PHYSICIANS, &c., &c.

IMPORTED OR MANUFACTURED BY

E. B. BENJAMIN,

No. 6 Barclay & 12 Vesey Streets,

One door West of the Astor House,

NEW YORK.

SOLE AGENT FOR

Ward's Plaster Casts, Trommsdorff's Pure Chemicals, &c., &c.

1872.

PREFACE.

IN response to the oft repeated and urgently pronounced requests of my large and generous constituency, I have much pleasure in presenting my first Catalogue to the kind perusal of themselves and the public.

From the nature of the work it will, I am sure, without any further proof, be admitted that a large outlay of money, and an immense expenditure of time, have been demanded. Very many of the illustrations now appear for the first time in this country, and most of the representations have been drawn from the objects themselves. The work has, consequently, been delayed far longer than was intended, and now, although the utmost care has been taken, I should not like it to be received as perfect. Doubtless some inaccuracies have crept in unawares, but these, I trust, will be found slight, and unimportant in character, and will, in consideration of the amount of work involved in the compilation, be gently criticized.

The classification of the articles will be, as far as possible, alphabetical; and, for the further convenience of those using the Catalogue, an Index is added. In this the articles are, without any regard to their uses, arranged alphabetically, with a number annexed, which refers to the page upon which a description of the article may be found.

It is well known that in apparatus which is imported, unimportant variations in form are always liable to be found. In this respect, it will always be my endeavor to secure the style which shall contain the latest improvements, and be the most effective in operation. My bottles are all made on my own forms, and I can confidently give a guarantee that every article named in the following pages will be in every way as represented.

In conclusion, I beg to thank those who have so generously supported me in the past, and to express a hope that this work will be found useful in our laboratories and factories, and indeed in the hands of any person who may refer to it.

E. B. B.

10 BARCLAY ST., N. Y.,
July, 1872.

WARSHAW
COLLECTION

No.

ERRATA.

During the printing of this book the following prominent errors were discovered :

- On page 6, No. 1252, for \$3.50 read \$5.50.
- " 21, " 1431, in nests of 1-12, per nest, \$4.50.
- " 23, " 1453, pints, 90c.
1476, price \$35.00.
1482, " .15.
1483, " .30.
- " 27, " 1501, for 22 oz. read 32 oz.
- " 28, " 1515, strike out 3 and 6 oz. sizes.
1515 a, Boh. top stopper, prices 20 per cent. less than 1515.
- " 30, " 1528, 2 gills., \$2.25.
- Pages 35 to 38, 20 per cent. reduction on those made here.
- On page 40, No. 1670, for \$1.00 read \$1.50.
- " 49, " 1780, should read \$40.00.
- " 52, " 1801, for .75 read \$1.75.
- " 52, " 1806, " drip read dip.
- " 52, " 1810, should read unmounted instead of mounted.
- " 53, " 1815, for frictional read fractional.
- " 56, " 1869, prices are per dozen instead of single.
- " 59, " 1890, should read perf. cover for gas reduction tube.
- " 63, " 1948, 50 cc, for \$1.40 read \$1.50.
" 100 " " 2.00 " 2.25.
" 200 " " 2.25 " 2.50.
" 250 " " 2.50 " 3.00.
- " 63, " 1952, for gramme read cc., and for the prices \$1.00, \$1.15, and \$1.25 each.
- " 65, " 1975, is of the new form having a glass shelf to support the triangle.
- " 69, " 2024, $\frac{1}{2}$ gall., \$10.00.
- " " 2025, 1 " " for \$14.00 read \$16.00.
- " " 2 " " 19.00 " 20.00
- " 72, " 2024, the price is \$20.00.
- " 75, " 2079, for \$9.00 read \$6.00.
- " 77, " 2120, " Tangent read Coulomb Torsin.
- " 79, " 2142, " \$6.00 read \$5.00.
- " 83, " 2177, should read \$5.50 to \$9.00.
- " 91, " 2253 a, Filter Patterns, per set, 60c.
- " 92, " 2276, 1 oz. single piece. 10c.
" 2 " " 12c.
" 4 " " 15c.
" 6 " " 20c.
" 8 " " 25c.
" 12 " " 27c.
" 16 " " 30c.
" 24 " " 35c.
" 32 " " 50c.
- " 93, " 2280, 4 " " 25c.
" 8 " " 30c.
" 16 " " 40c.
" 32 " " 60c.
- " 94, " 2301, instead of German silver point read file on handle.
- " 96, " 2323, " 1 oz. read 8 oz.
" " 18 " " 16 "
- " 2353, read \$1.25 for 75c.

On page 102, No. 2365 a, Fletcher's gas furnace, 50 burners, for smelting iron and other metals, \$30.00.

- " 103, " 2375, read \$45.00.
- " 104, " 2382, strike out $\frac{1}{2}$ gall. size.
- " 106, " 2397, for \$7.50 read \$9.50.
- " 112, " 2458, " \$35.00 read \$30.00.
- " 119, " 2557, " actual measure read actual measures
- " 121, " 2586, " \$1.50 read \$2.50.
- " 123, " 2604, " 3.00 " with swivel, \$4.50.
- " 125, " 2635, " guaged read gauged.
- " 126, " Illustration No. 6241 read 2641.
- " 127, " 2644, strike out words *and wire*.
- " 2645, " *ditto* under *and wire*, and for \$3.25 read \$3.75.
- " 127, " 2647, for 10 in., \$2.50 read \$2.00.
- " 2648, " \$4.00 read \$5.00.
- " 128, " 2675, the price is \$2.00.
- " 129, " 2693, for \$2.50 read \$3.00.
- " 136, " 2838, " \$1.50 to \$2.50 read \$2.50 to \$5.50.
- " 139, " 2890, for .75 read \$1.75.
- " 145, " 2953, read \$1.75.
- " 2954, " 2.50.
- " 2955, " 4.00.
- " 148, " 2993, for \$1.50 read \$2.00.
- " 2994, " 1.50 " 2.00.
- " 149, " 3001, prices are per dozen and not per single piece.
- " 3002, " " " " " " " "
- " 152, " 3040, 1 pint, \$3.50.
- " 153, " 3057, for \$9.00 per lb. read \$5.00.
- " 159, " 3147 a, Spoons, Blowpipe, of ivory, each 40c.
- " 160, prices of stop-cocks reduce 20 per cent.
- " 165, No. 3227, for \$1.50 read 75c.
- " 169, " 3304, " 4.00 " \$3.50.
- " 169, " 3306, " 4.00 " 10.50.
- " 170, " 3318 a, Tips, Blowpipe, brass, each 10c.
- " " b, " " solid platinum, each 75c.
- " 171, " 3343, for \$1.00 read \$100.00.
- " 171, " 3344, " 50c. read 40c.
- " 177, " 3401, the price is \$2.00.
- " 177, " 3408, 6 in., \$5.50 per dozen.
- " 181, Chemicals, see new price list
- " 207, No. 3477, for \$7.00 read \$10.00.
- " 3478, " 12.00 " 15.00.
- " 207, " 3479, " 3.00 " with swivel, \$4.50
- " 211, " 3485, read series of nine minerals and strike out No. 10.—Diamond.
- " 211, " 3488, for \$6.00 read \$10.00.
- " 214, " 3504, " 10.00 " 12.00.
- " 215, " 3505, " 10.00 " 15.00.
- " 215, " 3506, " 15.00 " 20.00.
- " 241, " 3593, " 4.00 " 6.00.
- " 250, " 3667, " 2.50 " 7.50.
- " 253, Chemicals, list of, for 101 read 181.
- " 259, " Lippincott's paper index, for 77 read 177.

N B.—Prices R. B. Crucibles and Evaps. have advanced; American made goods have declined.

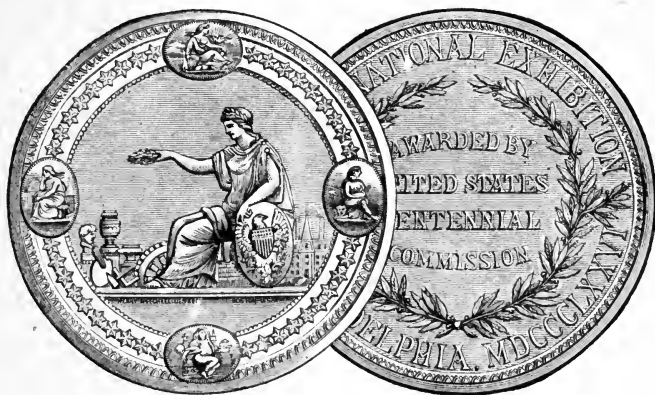
E. B. BENJAMIN,

10 Barclay Street, N. Y.

International Exhibition,

PHILADELPHIA, 1876.

FIRST PREMIUM



E. B. BENJAMIN,

10 Barclay Street, New York.

AWARDED FOR

“Excellence of Design and Finish in Chemical Apparatus
and Purity and Rarity of Chemicals.”

NOTICE.

THE "Albertype" of a portion of my lower show-room, exhibited in the front of this Catalogue, was prepared by Mr. E. Bierstadt, of this city, expressly for this work.

The prices placed against the several articles in the following Catalogue are for United States legal tender, and are arranged upon so low a scale that net cash payments will be required for single pieces, except when otherwise agreed. These prices are, of course, subject to alterations, according to the values of crude materials and labor, and to the fluctuations in the foreign markets. For example, I am already advised of a prospective advance on Becker's balances and weights at the beginning of 1873, amounting to about 10 per cent. on his prices in this catalogue.

The charges of packing and shipping must, of course, be borne by the purchaser; and, in the case of chemicals, unless otherwise directed, these will be put into bottles and suitable packages, the expense of which will be added to the cost of the materials themselves.

Damages occurring by breakage or otherwise, in transitu, are never entertained in this business, nor can claims for deductions of any kind be allowed, unless notice of the same be given within six days of the receipt of the goods. In every case the signed receipt for articles in good order will relieve the supplier from all responsibility.

In ordering goods, it is desirable that full shipping directions be given, as otherwise the selection of route will be considered as left to my own discretion. The fullest description of goods is also solicited, particularly when (as may be done) reference is made to any well known foreign catalogue.

Having engaged the services of an experienced glass-blower, numerous styles of small apparatus, not specified in this Catalogue, can be well and expeditiously manufactured. When such are required, it is necessary that the directions contain carefully prepared drawings and accurate dimensions.

All kinds of apparatus can be carefully and accurately repaired on the premises by experienced workmen.

Valuable apparatus, imported specially to order, for moderate terms, on commission. When such are imported for scientific institutions, they are free of duty.

The large outlay of money incident to the publication of this work compels me to make a charge of \$1.50 for each copy. This will partially cover expenses, and will, I am sure, be cheerfully paid by any who desire to consult the work.

E. B. B.



Entered according to Act of Congress, in the year 1872,
By E. D. BENJAMIN,
In the office of the Librarian to Congress, at Washington, D. C.

CATALOGUE.

FOR numbers 1 to 1,248 reference should be made to the Catalogue of Dr. H. A. WARD'S Casts of Fossils. This collection contains accurately formed models, and embraces all that has been discovered in reference to the Animal Kingdom, in its various subdivisions of Vertebrates, Articulates, Mollusks, Radiates, and Protozoans. Full descriptions will be found in the Catalogue, which, as a work of reference, should be in everybody's library.

Dr. Ward having paid me the compliment of making this establishment a special, and indeed, independent of his factory, the only depôt where his casts can be obtained at the manufacturer's prices, orders are earnestly solicited for these valuable additions to cabinets and college collections. The specimens are well arranged and classified for inspection, and can be supplied singly or in series.

Special attention is called to these casts, and a cordial invitation is extended to all who may feel a desire to inspect them. The extraordinary energy and ability displayed by Dr. WARD, in securing and collecting, from the most reliable sources, these remarkable specimens of **past ages**, is undoubtedly entitled to the warmest encouragement and earnest support on the part of his fellow countrymen. His depôts, established in London, and on the continent of Europe, are already giving him important evidence of the appreciation in which the people of those countries hold his successful endeavors for the advancement of science, and it is earnestly hoped, and indeed confidently believed, that as soon as it shall be generally known that a depôt has been established here, the people of the United States will also extend to the Doctor substantial tokens of their approbation.

Professor OWEN, in his popular work on a National Museum of Natural History, says: "A fossil bone, and a colored plaster cast of it, are not distinguishable at first sight—scarcely by sight at all. The artificial junction of a series of casts of the bones of an unique

fossil skeleton, produces a result equivalent, for all the purposes of public exhibition, to the articulated skeleton itself. Thus, every capital in Europe, the public museum of each civilized community, may show to the people the proportion of the creatures of former worlds, that science has so restored."

PRICES IN CURRENCY.

1248A.—Absorptiometer, Bunsen's, for measuring the absorption power of gases.

\$50.00

1249.—Acetometer, Otto's, of glass on wood foot, for indicating the per centage of anhydrous acid in vinegar, acetic acid, &c.; graduated 0 to 12 in fourths.

\$1.50

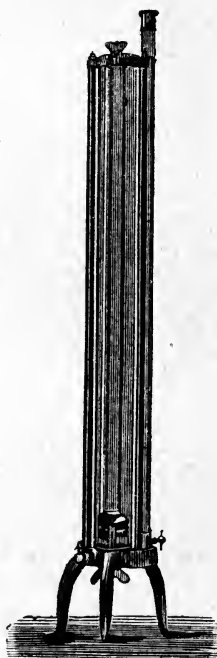
1250.—Acetometer, accompanied with hydrometer for liquids lighter than water, thermometer, and two ground stoppered



1252



1253



1248A

bottles, one containing test solution, the other solution of litmus, complete in leather case.

\$4.00

1251.—Acidimeter, according to Fresenius, for testing nitric acid.

.60

1252.—Acid Anhydrous Phosphoric. Apparatus for burning phosphorus in oxygen.

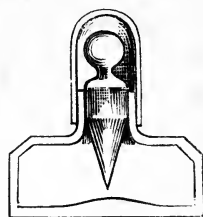
\$3.50

1253.—Acid Bottle, French, having an extra tight ground stopper, extending to the bottom of the bottle, especially used for testing coins, minerals, &c.

$\frac{1}{2}$	1	2 oz.
.25	.30	.35 each.

1254.—Acid or Cobalt Bottles, of Bohemian glass, having long stoppers, covered with ground caps.

$\frac{1}{2}$	1	2	4 oz.
.50	.63	.75	.90 each.



1254

1255.—Acid Brushes, of fine spun glass. Each, .50

1256.—Acid Carbonic, liquified under low temperature, in sealed glass tubes, enclosed in velvet-lined leather case. \$7.50

1257.—Acid Carbonic, apparatus, Dr. Scheibler's, for determining the quantity of carbonic acid in bone ash. \$35.00

1258.—Acid Carbonic, apparatus; the same as above, American. \$25.00

1259.—Acid Carbonic. Dr. Scheibler's new apparatus for quantitative volumetric analysis of carbonic acid, \$45.00

1260.—Acid Carbonic, generator, with lead tripod.

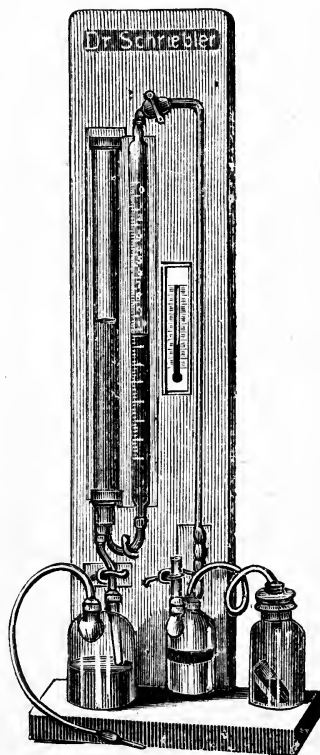
11 inches high, . . . \$9.00

14 " . . . 12.00

1261.—Acid Carbonic, generator, French make, very strong and heavy, with extra tubes, cocks, &c. \$25.00



1262

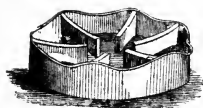


1257

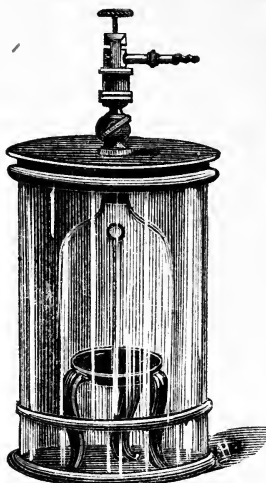
1262.—Acid Dishes, of Meissen porcelain, for freezing in vacuo, &c., with three partitions, five inches. Each, \$1.25

1263.—Acid Dishes, of Berlin porcelain, with six partitions.

$4\frac{1}{2}$	$5\frac{1}{2}$	$6\frac{1}{2}$ in.
\$1.15	1.30	1.50 each.



1263



1260



1264

1264.—Acid Dishes, of glass, plain, on three feet.

3	$3\frac{1}{2}$	$3\frac{3}{4}$ in.
.50	.60	.75 each.

1265.—Acid Hydrochloric apparatus, Hoffman's, for decomposition of Hydrochloric acid into hydrogen and chlorine, mounted on stand. \$6.00**1266.—Acid Hydrochloric.** The same apparatus as above, but unmounted. \$2.50**1267.—Acid Hydrochloric apparatus**, Hoffman's, unmounted, for showing that the gas evolved from this acid contains equal volumes of chlorine and hydrogen. \$3.00**1268.—Acid Jars**, for preparing test solutions in volumetric analysis, 1000 grains. \$2.25**1269.—Acid Jars**, accurately graduated, with double numbers, which can be read up or down.

100	200	300	400	500	1,000	} c. c.
in. 1	2	2	5	5	10	
\$2.00	2.50	3.00	3.50	3.75	4.00 each.	



1269

1270.—Acid Jars, on brass foot, registering 0 to 12. Each, .75**1271.—Acid Measures**, of porcelain, with lip.

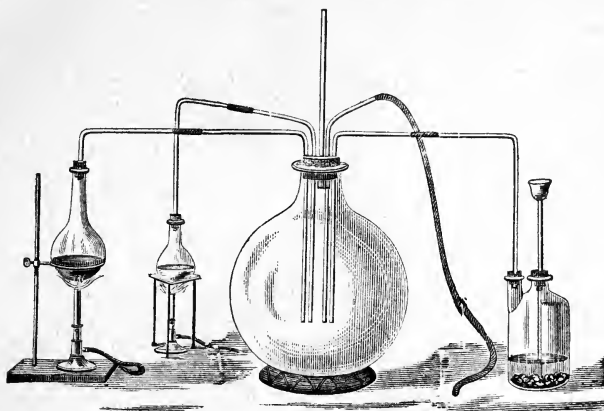
2	4	8	16	32 oz.
.30	.50	.90	1.50	1.80 each.

1272.—Acid Measures, of gutta-percha, conical, capacity 1 litre.

Each, \$2.00

1273.—Acid Measures, cylindrical glass.

1 litre,	2 litres,
\$3.00	3.50 each.



1274

1274.—Acid Sulphuric, apparatus for making.

\$3.00

1275.—Acid Phosphorus, apparatus for making.

\$2.50

1276.—Acid Pipettes, with rubber ball.

.75

1277.—Acid Syphon, of glass, with suction tube.

9	12	18	24 in.
.35	.40	.60	.75 each.

1278.—Acid Syphon, with Mohr's spring clamp, glass tip, and gutta-percha connection. Each size add .50

1279.—Acid Syphon, of glass, with suction tube and glass stop-cock, instead of Mohr's spring clamp, 18 in.

\$1.50

1280.—Acid Syphon, of glass, with delivery tube united by rubber.



1277



1281



1282

\$1.50

1281.—Adapters, French, bent, with ring around the larger end.

1	2	4	8 oz.
.08	.10	.15	.25 each.

1282.—Adapters, French, straight, with ring around the larger end, 16 oz. capacity. Each, .50

1283 —Adapters, of Bohemian glass, bent for connecting retorts with receivers, width at larger end.

$1\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{1}{2}$	3 in.
.30	.35	.50	.70 each.

1284.—Adapters, straight, of Bohemian glass,

$1\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{1}{2}$	3 in.
.25	.30	.45	.65 each.

1285.—Adapters, of Bohemian glass, 5 feet long. Each, \$2.50

1286.—Adapters, of vulcanized rubber, 10 inches long. Each, .50

1287.—Agate Slabs, with mullers, highly polished, for grinding into fine powder materials and minerals requiring careful investigation.

$5\frac{1}{4}$	$5\frac{3}{8}$	$5\frac{1}{2}$	$6\frac{3}{8}$	$6\frac{1}{4}$ in. sq.
\$12.00	15.00	19.00	22.00	25.00 each.

1288.—Air Cylinders, apparatus for \$12.00

1289.—Air Globes for weighing Gases.

1	2	3 gall.
\$1.25	2.00	3.00 each.

1290.—Air Thermometer Tubes, bulb 2 in. dia. Each, .25

1291.— “ “ “ “ 3 inches. “ .50

1292.—Alcoholometry. Dr. Pyle's Book, containing tables with calculations for estimating true alcoholic per centages according to McCulloch. .75

1293.—Alcoholometers, U. S. Standard, in chamois-lined leather cases, with thermometer scale on hydrometer, and extra thermometer, comprising (with the book above referred to) the complete apparatus for dealers in proof spirits, &c., according to U. S. C. standard for exact estimates. Each, \$7.00

1294.—Alcoholometers, Tralles & Richter's, in leather cases.

Each, \$3.50

1295.— “ “ “ in chamois-lined leather cases, with jar and thermometer. Each, \$6.00

1296.—Alcoholometers, Tralles's, with jar and thermometer, in chamois-lined leather cases. Each, \$5.00

1297.—Alcoholometers, U. S. Standard, with thermometer attached, and most accurate proof scales in paste-board cases.

Each, \$3.00

- 1298.—Alcoholometers, U. S. Standard,** Tralles & Richter's scale, with thermometer, as above. Each, \$2.20
- 1299.—Alcoholometers,** without thermometer, in round, pasteboard cases. Each, \$1.00
- 1300.—Alcoholometers,** Gay Lussac's centesimal scale, in pasteboard cases. Each, \$1.50
- 1301.—Alcoholometers,** Gay Lussac and Cartier's, in tin boxes. Each, \$1.00
- 1302.—** “ graduated 15 to 95, No. 204. Each, .50
- 1303.—** “ Cartier's, French, in round cases. Each, .75
- 1304.—** “ French, in pasteboard boxes, graduated 0 to 40; very delicate and correct instruments. Each, \$1.25
- 1305.—Alcoholometers,** French, in tin boxes, graduated 10 to 40. Each, .50
- 1306.—** “ in tin cases, smaller size (No. 1,093). Each, .25
- 1307.—Alcoholometer Jars,** with glass feet, according to size. Each, .50 to .75
- 1308.—** “ “ with brass feet. Each, .90
- 1309.—Alembics,** glass, Bohemian, with loose head and tightly ground joints.

8 oz.
\$1.30

Pints.
1.80

Quarts.
2.50 each.



1309



1313

- 1310.—Alembics,** glass, German, with fast heads, tubulated, quarts. Each, \$1.50
- 1311.—** “ porcelain, with loose heads, 12 oz. “ \$1.50

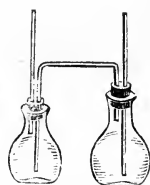
1312.—Alembics, Salleron's, for testing wines and saccharine alcoholic liquors, with heating apparatus. Each, 15.00

1313.—Alembic, Salleron's, for testing the quantity of alcohol in wine and spirits. Large size. \$25.00

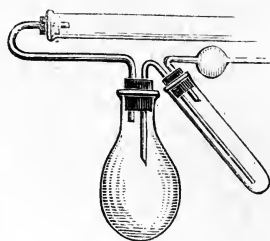
1314.—Alembic Stoneware, for sublimations, &c., all sizes, from \$3.00 to \$7.50



1315



1316



1317

1315.—Apparatus, for the determination of carbonic acid in carbonates, Wetherell's form. Each, \$1.25

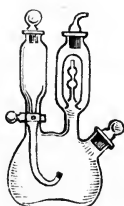
1316.— “ Fresenius & Wills's form (No. 450) Ea. .65

1317.— “ Berzelius's “ (“ 498) “ .75

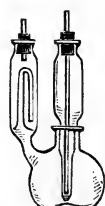
1318.— “ Rose's “ (“ 460) “ 1.25



1318



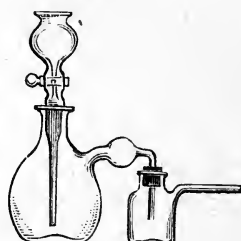
1321



1322



1324



1325

1319.— “ Mohr's form (No. 503) Ea. \$1.25

1320.— “ Fresenius's “ (“ 451) “ .75

1321.— “ Schrödtter's “ (“ 456) “ 2.00

1322.— “ Geissler's “ (“ 455) “ 1.50

1323.— “ Fresenius's new form (“ 452) “ 1.50

1324.— “ Schaffner's “ (“ 453) “ .75

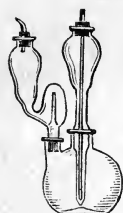
1325.— “ Kipp's “ (“ 462) “ 1.75

1326.— “ Kipp's “ (“ 461) “ 1.75

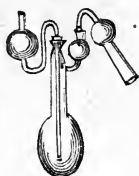
1327.— “ “ “ (“ 464) “ 1.65

1328.— “ Mohr's “ (“ 467) “ 1.50

- 1329.—Apparatus,** Erdmann's new form (No. 465) Ea. \$1.50
1329A.— " Bunsen's " 1.75



1329



1329A



1333



1334



1335

- 1330.—Alkalimeter,** Descroizillé's, of glass, mounted on wood foot graduated from 0 to 100, in ones. \$2.00
1331.—Alkalimeter, Mohr's, with glass foot, graduated, 0 to 100. \$1.75
1332.—Alkalimeter, Ure's, with glass foot and stop-cock, and channel stopper for pouring liquids. \$2.00
1333.—Alkalimeter, Leslie's, with glass foot, cork-stopper, and two pipette tubes. \$1.50
1334.— Dtto, Descroizillé's, on glass foot, graduated 0 to 100. \$1.50
1335.— " Gay Lussac, with wood foot.

25 c. c.

 $\frac{1}{2}$

\$1.75

50 c. c.

 $\frac{1}{2}$

2.25

100 c. c.

 $\frac{1}{2}$

2.50 each.

Alkalimeters not mounted on stand. See Burettes.

- 1336.—Ammonia.** Hoffman's apparatus for decomposing ammonia. \$6.00
1337.—Ammonia. Apparatus for ascertaining the exact proportions of hydrogen and nitrogen in ammonia. Unmounted, \$3.00
1338.—Ammonia carboys, for concentration of the stronger acids and ammonia, 2 necks, with delivery tube, German, glazed outside, of 200 litre capacity. \$50.00
1339.—Ammonia carboys; two of the above, including connection. \$100.00

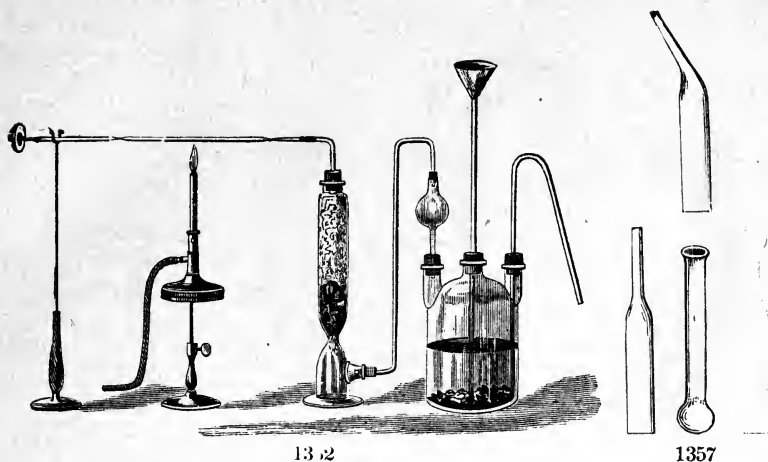


1339

1351

- 1340.—Ammonia Chloride**, apparatus for illustrating the formation of Chloride of Ammonia, by condensing the vapors of hydrochloric acid and ammonia. This consists of a gallon glass flask, to which are attached two tubes by means of an India-rubber connection. \$2.50
- 1341.—Annealing Cups**, of porcelain. .25
- 1342.—Ditto**, of porous clay. Per doz., \$2.50
- 1343.—Analysis**, apparatus for organic analysis, according to Liebig, complete. \$45.00
- 1344.—Anvils for Blowpipes**, small, with square ends. Each, .75
- 1345.—Ditto**, large. " \$1.00
- 1346.—Ditto**, round, with hammer, etc., complete. " 10.00
- 1347.—Aphlogistic or Flameless Lamp**, with platinum sponge and glass wick-holders. Each, .75
- 1348.—Aphlogistic Lamp Sponges**, with glass wick-holders. Each, .40
- 1349.—Arsenic**, Marsh's apparatus for the detection of, unmounted. Each, .50
- 1350.—Ditto**, mounted. \$4.25
- 1351.—Ditto**, brass stopcocks for the above. Each, \$1.25
- 1352.—Ditto**, Fresenius's apparatus for the detection of. 5.00
- 1353.—Ditto**, Mitscherlich's ditto. 3.00
- 1354.—Arsenic Plates**, plain.

No.	000	00	0	1	2
	.12	.15	.25	.30	.40 each.



1355.—Arsenic Plates, Meissen, with Lips.

Small,	medium,	large.
.35	.40	.50 each,

1356.—Arsenic Tubes, five different forms. Per doz., .50 to .75

1357.—Ditto, three kinds for sublimation. Per doz., .75

1358.—Aspiration Apparatus, consisting of three bottles, mounted, in box, with suction and delivery tubes for inhaling the vapor of medicinal solutions. \$2.00

1359.—Ditto, ordinary. 1.50

1360.—Aspirators, of glass, with brass stopcocks. Quarts, ea. 2.00

1361.—Ditto, ditto, $\frac{1}{2}$ Galls. " 2.50

1362.—Ditto, ditto, Galls. " 3.00

1363.—Ditto, Liebig's. Each \$1.50 to 2.50

1364.—Ditto, of glass, with glass stopcocks.

Litres	$\frac{1}{2}$	1	2	4	8
	\$3.50	3.75	4.75	6.25	9.50 ea.

1365.—Aspirator Tubes. Each, .50

Assay Apparatus, for the various articles used in assaying, such as basins, bellows, blowpipes, crucibles, covers, cupels, dippers, roasting dishes, flasks, hammers, ingot moulds, muffles, scoops, stopcocks, tongs, &c. See their respective alphabetical positions.

1366.—Atomizers, of glass. Each, .25

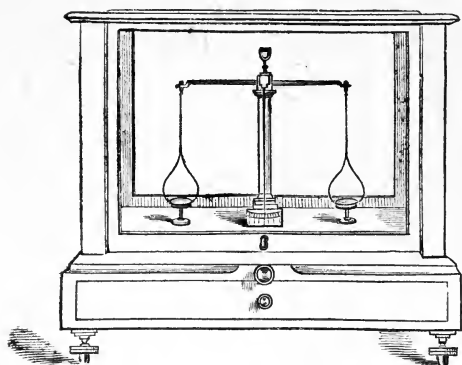
1367.—Attachments, brass, for blowpipes. " .75

1368.—Atropia Bottles. " .50



1368

H. TROEMNER'S STANDARD BALANCES.



1369

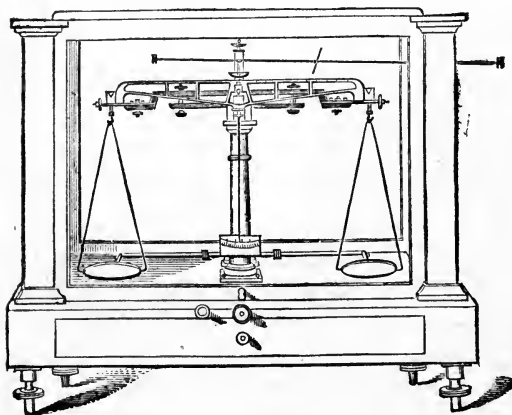
1369.—Assay Balances, in French polished glass case, beam resting on agate bearings. Sensible to $\frac{1}{20}$ milligramme. \$55.00

1370.—Ditto, ditto. When loaded up to 1 gramme in each pan, needle deviates 10 divisions on the scale for one milligramme; $\frac{1}{100}$ part of a milligramme is there-

fore to be seen. Steel knives with agate bearings. \$75.00

1371.—Ditto, ditto, for up to 10 grammes in each pan. 75.00

1372.—Ditto, ditto, in French polished glass case. Is arranged with rider apparatus and pan arrests. Open beam, divided in $\frac{1}{10}$ milligramme; beam resting on agate planes. Needle shows ten divisions for one milligramme. \$80.00



1375

1373. — Analytical Balance, in French polished mahogany case, with counterpoised sliding door. Capacity 100 grm., sensible to $\frac{1}{1000}$ grm. Steel bearings, movable $3\frac{1}{2}$ in. pans, 10 in. beam. \$40 00

1374.—Ditto, ditto, has attachment for rider, and pan arrests. Beam graduated to one milligramme. \$50.00

- 1375.**—Ditto, ditto, in fine polished glass case, capacity 100 grammes in each pan. Beam divided in half parts of milligrammes. Sensible to $\frac{1}{10}$ milligramme, with apparatus for specific gravity. All bearings agate. $2\frac{3}{4}$ in. pans, 12 inch beam. \$86.00
- 1376.**—Ditto, ditto, all bearings and planes agate. \$96.00
- 1377.**—Ditto, ditto, capacity 200 grammes in each pan, in fine polished glass case, beam divided in $\frac{1}{10}$ milligramme, sensible to $\frac{1}{10}$ milligramme. All agate bearings, with improved arrest for pans, and apparatus for specific gravity, &c., &c. 3 in. pans. Beam 14 in. \$105.00
- 1378.**—Ditto, ditto, all bearings and planes agate. 115.00
- 1379.**—**Coin Scale**, for least current coin, in French polished glass case, with counterpoised sliding doors, $7\frac{1}{2}$ inches beam, sensible to $\frac{1}{8}$ th grain. \$24.00
- 1380.**—Weights \$20 piece to \$1, adjusted to the least Current Standard, in velvet lined box. \$6 00

1381.—**Specific Gravity Scale.**—Constructed after the plan of Dr. Mohr. \$20.00

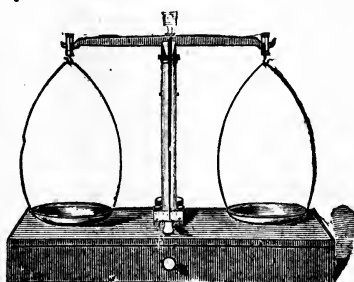
1382.—**Chemical Scales**, for general weighing, on polished box, with drop lever, especially constructed for laboratory use. Including weights.



	Diam. of Pan.	Beam.	Capacity.	Price.
	5 in.	9 in.	32 oz.	\$15.00
1383. —4 "	8 "	16 "	12 00	
1384. —3 "	7 "	8 "	10.00	

Pans can be suspended by chains if desired.

1385.—**Analytical Scales**, for weighing Ores, Minerals, Gold and Silver Coin, Jewelry, Chemicals, &c., &c. On fine polished mahogany box, with drawer. Lacquered beam, with box ends, movable pans, ivory indicator. Sensible to $\frac{1}{20}$ grain. Price does not include weights.



1385

	Length of Beam.	Diam. of Pan.	Capacity.	Price.
	14 in.	6 in.	25 oz.	\$24.00
1386. —Do.	10 "	4 $\frac{1}{4}$ "	16 "	18.00
1387. —Do.	8 $\frac{1}{2}$ "	3 "	8 "	15.00

Pans can be suspended by chains if desired.

1388.—Students Balance, in polished mahogany case, sliding front counterpoised. Improved apparatus for raising beam. Beam, $7\frac{1}{2}$ in.; pans, $2\frac{1}{2}$ in. diameter. Loading 50 grms. and sensible to $\frac{1}{32}$ th. **\$26.00**

1389.—Prescription Scales, on polished mahogany box, with marble top. Ebony mouldings. With weights.

	Pans.	Brass.	Nickel Plated.
	$2\frac{1}{2}$ in.	\$12.00	\$14.00
1390.—Do.	$2\frac{3}{4}$ "	14.00	16.00
1391.—Do.	3 "	16.00	19.00

1392.—Gold Scales. For Jewelers, Brokers, &c. Finely finished scale, on polished mahogany box, with drawer. Very accurately adjusted. Weights included.

	Length of Beam.	Diam. of Pans.	Weights.	Price.
	12 in.	6 in.	64 oz.	\$25.00
1393.—Do.	9 "	5 "	32 "	15.00
1394.—Do.	8 "	4 "	16 "	12.00
1395.—Do.	7 "	3 "	8 "	10.00

1396.—Jeweler's Balance. Glass case, 35 inches high, 32 inches wide. Very *superior* balance, of the finest finish. Has open beam, 8 in. movable pans, capacity 200 oz. in each pan. Sensible to $\frac{1}{2}$ grain when loaded. Case of French polished mahogany, with counterposed sliding door. Price includes a set of weights, 50 oz. to 1 grain (125 oz. in all), which are neatly fitted in the drawer of case. **\$85.00**

Same balance, with weights from 100 oz. down. **90.00**

1397.—Bank Specie Balance. Balance on polished mahogany platform, with glass level and levelling screws; beam, 22 inch, provided with extra pan and balance weight. Capacity, \$500 silver or \$5,000 gold at a draft; sensible to one grain when loaded. Price does not include weights. **\$90.00**

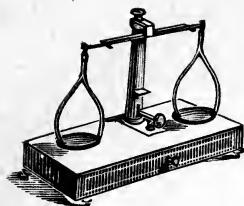
1398.—Do. Same balance, in a glass case of polished mahogany, with counterpoised sliding door. **\$120.00**

1399.—Balances for Druggists and Assayers, "weighing in," on marble slab, carefully adjusted. **Each, \$15.00**

1400.—Ditto, ditto, wooden foot and drawer for tools and weights. **Each, \$10.00**

1401.—Ditto, of horn, with beam.

Pans.—Size,	3.	$3\frac{1}{2}$	4 in.
Price,	\$2.50	3.50	4.50 each.



1400



1401



1405



1411

1403.—Balloons, of Collodion, extremely light and thin, for ascension, with hydrogen gas.

Size,	10	12 in.
Price,	.75	\$1.00 each.

1404.—Balloons, French Rubber. Each, .75

1405.—Ditto, Goldbeater Skin, from \$1.50 to \$5.

(These balloons, when not in use, should be kept in a close package, with a little camphor, to preserve them from insects. They should never be wetted.)

Balloons, of Glass. See Air Globes.

1406.—Barometer, for use in schools, usual form, from \$3 to \$15.

1407.—Barometer, Bunsen's Syphon, graduated on both branches in millimeters, filled. \$12.00



1407

1408.—Barometers, Aneroid, accurately adjusted; same as used in the University of Vienna. Each, \$30.00

1409.—Ditto, with Storm Glass. The rising of the milky substance indicates approach of storm. Each, \$3.00

1410.—Barometer Tubes, 3 feet in length, sealed at one end. .50

1411.—Ditto, with bulb, for use with mercury. Each, .75

1412.—Ditto, including the mercury. " \$1.25

1413.—Barometer Bulb Tubes. " .50

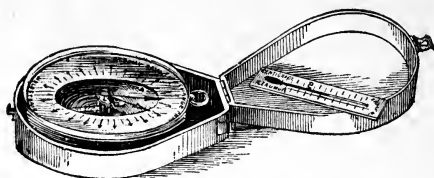
Basins and Dishes. See Crystallizing and Evaporating Apparatus.

1414.—Basket of Lead, for holding pieces of zinc in hydrogen generators. Each, .50

Batteries. See Electrical Apparatus. Baths, Eye, see E.

1415.—Beakers, of the *very best* Bohemian glass, thoroughly annealed, and of uniform thickness, for enduring extremes of

✓ temperature, of Berzelius's usual form, in nests of 00 to 1, containing $1\frac{1}{2}$ to 3 ounces. Per nest, .20



1408

PER NEST.

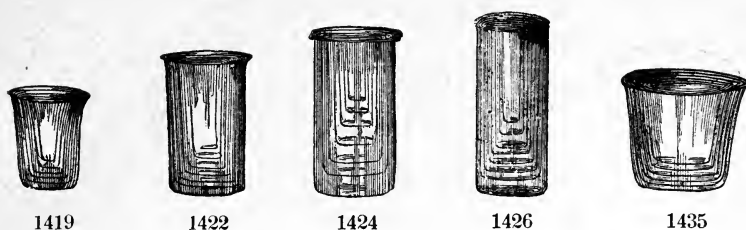
1416.	Beakers,	in nests of 4,—00 to 2,	containing $\frac{1}{2}$ to 4 ozs.	.35
1417.	Ditto,	ditto, 3,—1 to 3,	" 3 to 6 "	.40
1418.	Ditto,	ditto, 5,—0 to 4,	" $1\frac{1}{2}$ to 9 "	.65
1419.	Ditto,	ditto, 5,—1 to 5,	" 3 to 15 "	.75
1420.	Ditto,	ditto, 6,—0 to 5,	" $1\frac{1}{2}$ to 15 "	.80
1421.	Ditto,	ditto, 7,—0 to 6,	" $1\frac{1}{2}$ to 21 "	\$1.10
1422.	Ditto,	ditto, 9,—0 to 8,	" $1\frac{1}{2}$ to 48 "	2.00
1423.	Ditto,	ditto, 10,—0 to 9,	" $1\frac{1}{2}$ to 70 "	2.25
1424.	Ditto,	ditto, 13,—0 to 12,	" $1\frac{1}{2}$ to 140 "	4.00

(The capacities are approximate only.)

1425.—Ditto, ditto, (singly). The capacities below, and dimensions, are approximate :

NOS.	HEIGHT.	WIDTH.	CONTENTS.	PRICE, EACH.
0	2 inch.	$1\frac{1}{4}$ inch.	$1\frac{1}{2}$ ounce	.06
1	$2\frac{1}{2}$ do.	$1\frac{1}{2}$ do.	3 do.	.09
2	3 do.	$1\frac{3}{4}$ do.	4 do.	.12
3	$3\frac{3}{8}$ do.	2 do.	6 do.	.16
4	4 do.	$2\frac{1}{4}$ do.	9 do.	.20
5	$4\frac{5}{8}$ do.	$2\frac{5}{8}$ do.	15 do.	.25
6	$5\frac{3}{8}$ do.	3 do.	21 do.	.35
7	$6\frac{3}{8}$ do.	$3\frac{1}{4}$ do.	33 do.	.40
8	$7\frac{1}{2}$ do.	$3\frac{3}{4}$ do.	48 do.	.45
9	$8\frac{1}{4}$ do.	4 do.	70 do.	.55
10	$9\frac{1}{4}$ do.	$4\frac{1}{2}$ do.	85 do.	.65
11	10 do.	5 do.	110 do.	.75
12	11 do.	$5\frac{1}{2}$ do.	140 do.	.90

1426.—Beakers, tall and narrow ; French form, very thin, 8 in a nest. Nos. 1 to 8. Price per nest, . \$3.50



NOS.	HEIGHT.	WIDTH.	CONTENTS.	PRICE, EACH.
1	2 $\frac{3}{8}$ inch.	1 $\frac{1}{2}$ inch.	1 $\frac{1}{2}$ ounce.	.25
2	3 do.	2 do.	2 do.	.30
3	4 $\frac{3}{8}$ do.	2 $\frac{1}{2}$ do.	4 do.	.40
4	5 do.	2 $\frac{5}{8}$ do.	6 do.	.50
5	6 $\frac{1}{2}$ do.	3 do.	16 do.	.60
6	8 do.	3 $\frac{1}{2}$ do.	24 do.	.70
7	9 $\frac{1}{2}$ do.	4 do.	32 do.	.80
8	10 do.	4 $\frac{1}{2}$ do.	$\frac{1}{2}$ gal. 48 oz.	\$1.00

1427.—Beakers, best Bohemian Glass, Berzelius's form, extra wide nests, from Nos. 1 to 6, same size as Griffin's lipped, full nests.

Each, \$1.75

1428.—Ditto, very large, Nos. 10 to 13, nests of 4. “ 3.50

1429.—Ditto, full nests of 15,—00 to 13. “ 7.00

1430.—Ditto, singly. Each, .15 to 2.00

1431.—Ditto, Griffin's wide form, lipped.

NOS.	DEPTH.	WIDTH.	CAPACITIES.	PRICE, EACH.
1	3 inch.	2 $\frac{1}{4}$ inch.	5 ounce.	.15
2	3 $\frac{1}{2}$ do.	2 $\frac{1}{2}$ do.	8 do.	.25
3	4 do.	3 do.	12 do.	.30
4	4 $\frac{1}{2}$ do.	3 $\frac{1}{2}$ do.	20 do.	.35
5	5 do.	3 $\frac{3}{4}$ do.	25 do.	.40
6	5 $\frac{1}{2}$ do.	4 $\frac{1}{2}$ do.	40 do.	.55
7	6 $\frac{1}{4}$ do.	4 $\frac{3}{4}$ do.	do.	.60
8	7 $\frac{1}{4}$ do.	5 do.	do.	.70
9	8 $\frac{1}{2}$ do.	5 $\frac{3}{4}$ do.	do.	.80
10	9 $\frac{1}{4}$ do.	6 $\frac{1}{4}$ do.	do.	.90
11	9 $\frac{3}{4}$ do.	6 $\frac{3}{4}$ do.	do.	\$1.00
12	10 do.	7 do.	do.	1.10

1432.—Beakers, ditto, ditto, nests of 3,—1 to 3. Each, .60



1437



1438



1441



1442



1443

1433.—Beakers, Griffin's wide form, lipped, nests, 4,—1 to 4, ea. .95

1434.—Ditto, 5,—1 to 5. Each, \$1.35

1435.—Ditto, 6,—1 to 6. " 2.00

1436.—Ditto, glass, flat bottom, perpendicular sides, without rim, shallow (from 2 to 2½ inches deep), nests of 4, small.

Each, .75

1437.—Ditto, nests of 9. " \$2.00

1438.—Ditto, tall conical, with lip, 8 ounce capacity. " .50

1439.—Ditto, porcelain, egg shape, flaring mouth, useful in dissolving metals and acids. Each, .30

1440.—Beale's Quick Filter. .75

1441.—Beehive, shelves. Small, 25c.; large, 75c.

1442.—Bell Glasses, flat knobbed.

6 inch.

\$1.25

8 inches diameter.

1.75 each.

1443.—Ditto, swelled, with knob.

½
\$1.50

1
2.00

2 gal.
3.00 each.

1444.—Ditto, open tops.

½
\$1.75

1
2.50

2 gal.
3.50 each.

1445.—Ditto, French, knobbed, tall.

pints.
.30

quarts.
.60

½
\$1.00

1 gal.
1.50 each.

1446.—Ditto, American, tall.

pints.
.40

quarts.
.75

½
\$1.00

1
1.50

3
3.75

5 gal.
7.50 each.

1447.—Ditto, French, tall, with foot, made to be reversed, for use with light and heavy gases or fluids, vase form.

½
\$1.50

1
1.75

2 gal.
2.75 each.

1448.—Ditto, American, with small foot.

½
\$1.25

1
1.50

1½
1.75

2 gal.
2.50 each



1449.—Bell Glasses, tall, wide open top.

pints.	quarts.	$\frac{1}{2}$	1 gal.
.50	.75	\$1.00	1.50 each.

1450.—Ditto, with glass plate on top, extra.

Each, .25

1451.—Ditto, open mouth, for caps.

quarts.	$\frac{1}{2}$	1 gal.
.75	\$1.00	1.50 each.

1452.—Ditto, with brass cap and stopcock.

quarts.	$\frac{1}{2}$	1 gal.
\$2.25	2.75 ✓	3.25 each.

1453.—Ditto, accurately stoppered with fine ground emery.

quarts	$\frac{1}{2}$	1 gal.
\$1.00	1.50	1.75 each.

1454.—Ditto, 16 oz., with hole in stopper, large enough to introduce a tube.

.75

1455.—Ditto, for hydrogen lamps, 8 oz.

“ .35

1456.—Ditto, open mouth, with tubulature at bottom, for use with Bunsen's pump.

pints.	quarts.
\$1.75	\$2.25. each.

1457.—Ditto, with heavy emery ground mirror glass plate for the bottom.

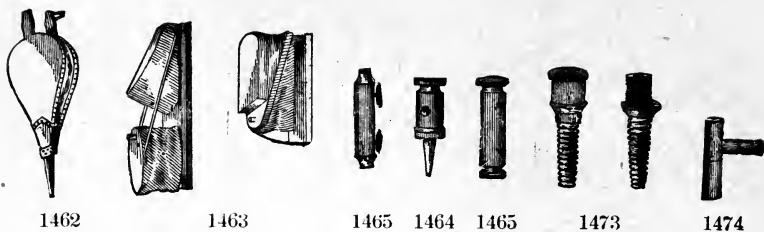
pints.	quarts.
\$2.75	3.25 each.

1458.—Ditto, Bohemian, having the base stoppered with large ground glass stopper, cut and polished on the bottom.

4	8	16	32 oz.
.30	.50	.75	\$1.00 each.

1459.—Ditto, open top, graduated in cubic centimetres.

500	1,000	2,000	2,500 cc.
\$2.50	3.50	5.25	5.50 each.



1460.—Bell Glasses, with cap and brass cock fitted.

500	1,000	2,000	2,500 cc.
\$4.00	5.00	6.75	7.25 each.

1461.—Ditto, fitted with glass globes, with brass cap, stopcocks, etc., 1 gal. Each, \$6.00

Bell-Shaped Gasometers. See Gasometers.

1462.—Bellows, hand.

6	8 inch.
.75	\$1.00 each.

1463.—Ditto, double action blast, for use with the foot.

single air receiver.	double.
\$4.00	6.00 each.

1464.—Binding Screws, for connecting poles of Batteries, fancy styles. Each, .50

1465.—Ditto, for connecting poles of batteries, plain. " .25

1466.—Binding Clamps, for Smee's batteries. " .75

1467.—Ditto, for Bunsen's smaller battery. Per sett, .75

1468.—Ditto, for Bunsen's larger battery. " \$1.25

1469.—Bladders, hogs'. Each, .10

1470.—Ditto, with brass neck. " .60

1471.—Ditto, with stopcock and plain bubble pipe. " \$2.50

1472.—Ditto, for exploding gases. " 1.00

1473.—Bladder Pieces. " .50

Blast Lamps. See Burners.

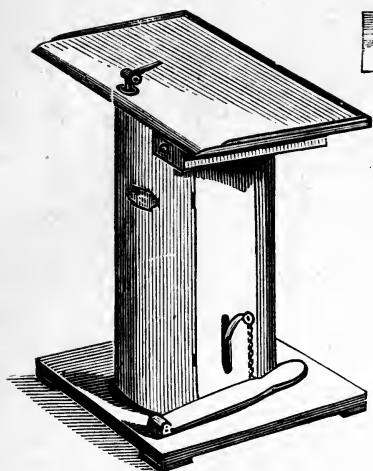
1474.—Blast Attachment, for blowpipe, brass. " .75

1475.—Blood, Circulating Apparatus, to illustrate the mode of circulation of the blood through the veins.

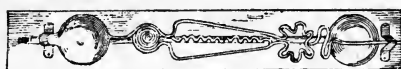
Small, \$4.00	Large, \$10.00
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1476.—Blowpipe Tables, best French make, with iron top, and drawer for tools, having brass discharge pipe with two nozzles. Each, \$40.00

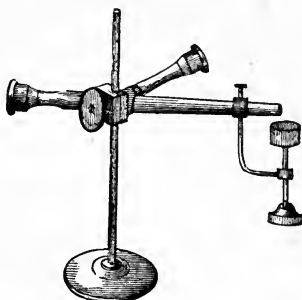
1477.—Blowpipes, ox-hydric, small size. " 5.00



1476



1475



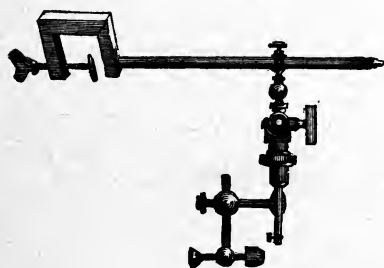
1478

1478.—Blowpipes, compound, mounted on stand. Each, \$7.50

1479.—Blowpipe, ox-hydric, compound, on stand, with double stopcock. \$10.00

1480.—Ditto, ox-hydric, unmounted, very powerful. 15.00

1481.—Ditto, for oxhydric or calcium light, carefully finished, with regulating screws. 20.00



1481



1491

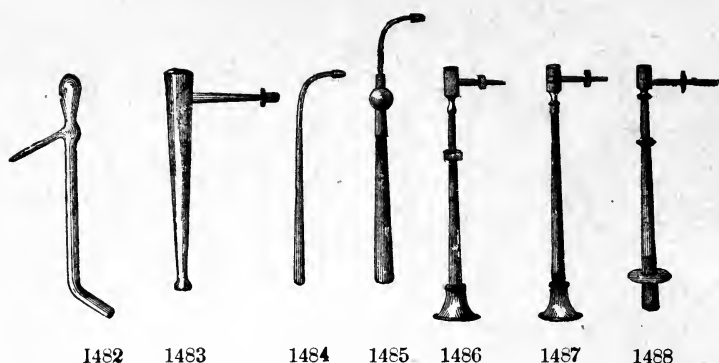
1482.—Blow-pipe, of glass. .25

1483.—Ditto, Black's, conical, of japanned tin, with movable brass nozzle. .40

1484.—Ditto, brass, jewelers' form, 8 inch. Each, .25

1485.—Ditto, ditto, with brass bulb. " .75

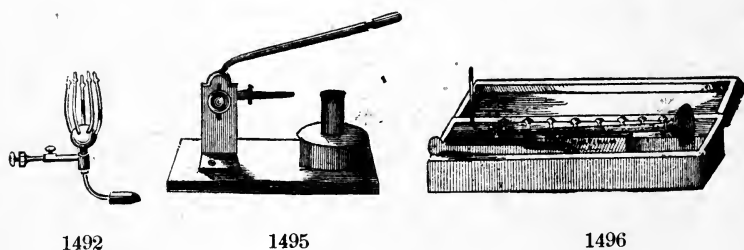
1486.—Ditto, brass, Berzelius's form, short nozzle piece, and soldered platinum tips, in paper cases. Each, \$2.00



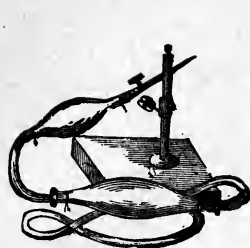
- 1487.—**Blow Pipes**, brass, with barrel-shaped head, soldered platinum tip. Each, \$2.50
- 1488.—Ditto, Plattner's form, brass, extra fine, with two tips, and extra heavy soldered platinum ends, including mouth-piece having combined effect of trumpet and cylinder. Each, \$3.00
- 1489.—Ditto, ditto, German silver. " 3.50
- 1490.—Ditto, ditto, ditto, nickelized. " 4.00

(The last mentioned will not become easily oxidized.)

- 1491.—Ditto, brass, with blast attachment for gas, and regulating screw with mark. Each, \$3.00



- 1492.—Ditto, Plattner's spinne, of brass, having five jets from one reservoir, to be used in connection with Rose's Lamp and Blow Table, to produce a high heat for fusing minerals, etc. Each \$5.00
- 1493.—Ditto, Bunsen's, blast, mounted on round iron foot, having a rubber attachment, connecting with a horn-mouth piece. Each \$5.00



1497



1498



1505



1504



1501

1494.—Blow-pipe Brass, with ivory-mouth piece, mounted on fine mahogany stand, having jet arranged with thumb-screw, so that it may be turned in either vertical or horizontal directions. Each \$3.50

1495.—Ditto, ditto, with brass lamp. “ 4.50

1496.—Ditto, in fine mahogany case, containing one Berzelius blow-pipe, with soldered platinum end, ten reagent cells with caps, pair of forceps and box for platinum. Each \$5.00

1497.—Blow-pipe, mounted on stand, with automatic bellows. Each \$12.00

Blow-pipe Apparatus. See Apparatus.

1498.—Bolt Heads, of Bohemian glass.

4	8	16 oz.
.35	.40	.50 each. ✓

1499.—Bolt Heads, with long neck of ordinary glass.

Each, .60 to \$1.00

Bone Ash. See Chemicals.

1500.—Bottles for Chameleon. Each \$5.00

1501.—Bottles, for Gas, Bohemian and French.

8 oz., .35 16 oz., .45. 22 oz., .65 each.

1502.—Ditto, French narrow-mouthed, or Packing bottles, for corks, pressed, per doz.

$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	6 oz.
.20	.25	.30	.35	.40	.50	.65



1502

1503.—Ditto, ditto, ditto, oval, 2 oz., per doz. .60

1504.—Ditto, best quality white imported blown glass, with ring around the neck and wide mouths.

$\frac{1}{4}$	$\frac{1}{2}$	1	2	4.	6	8	16	32 oz.
.40	.50	.75	\$1.00	1.25	1.50	1.75	2.50	4.00 per doz.

1505.—Ditto, ditto, narrow mouthed, same as above.



1506.—Bottles, American pressed, furnished only on special application. Price much below the above.

1507.—Ditto, French colored glass, narrow mouth.

1 oz., .50 2 oz., .60 4 oz., .75 6 oz., \$1.25 12 oz., 1.75

1508.—Ditto, ditto, ditto, wide-mouthed, same prices.

1509.—Ditto, German, wide and vial mouth.

$\frac{1}{2}$	1	2	4	8	16 oz.
.40	.45	.50	.65	.75	\$1.50 per doz.

1510.—Ditto, French sample, tall and taper for corks, each .40 to .50

1511.—Ditto, sample, for syrups, on glass foot. Each .25

1512.—Ditto, sample, French, narrow shape and long, of white glass. Per doz. \$1.25

1513.—Ditto, salt-mouths, American, or wide-mouthed bottles for storing salts, ground glass stoppers, with mushroom tops.

pints.	quarts.	$\frac{1}{2}$	1 gal.
\$2.70	4.00	5.25	12.00 per doz.

1514.—Ditto, German, ditto, ditto, ditto.

1	2	4	6	8	12	16	24	32 oz.	$\frac{1}{2}$ gal.
\$1.25	1.50	1.75	2.00	2.25	2.75	3.25	4.00	5.00	8.00 doz.

1515.—Ditto, ditto, Bohemian, with finely-cut and polished tops, made of glass free of lead, and not easily affected by chemicals.

1	2	3	4	6	8	16	32 oz.
\$2.00	2.25	2.50	2.85	3.50	4.00	5.50	7.00 per doz.

1516.—Ditto, salt-mouths, French, with hand made stoppers accurately double-ground with the finest emery, so that reagents stored in them, will not deteriorate.

$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	2	4	8	12	16	32 oz.
\$1.15	1.20	1.25	1.30	1.50	2.25	3.00	4.00	5.00	5.50	7.00 per doz.

1517.—Ditto, French, colored.

1	2	4	8	1	32 oz.
\$2.00	2.50	3.00	6.00	8.00	10.00 per doz.

1518.—Bottles, ditto, Bohemian black, cut and polished mushroom tops, for storing chemicals which are required to be kept from the light. Per doz. \$6.50

1519.—Ditto, American tincture, or narrow-mouth, with ground glass stoppers and mushroom tops

4	8	16	32 oz.	$\frac{1}{2}$ gal.	1 gal.	2 gal.
\$2.00	2.25	2.63	3.00	5.25	8.00	24.00 per doz.

1520.—Ditto, ditto, square-pressed stoppers.

8	16	32 oz.
\$2.25	2.63	3.00 per doz.

1521.—Ditto, ditto, German flat top stoppers.

$\frac{1}{2}$	1	2	3	4	6	8	12	16	32 oz.
\$1.00	1.25	1.50	1.75	2.00	2.25	2.75	3.50	3.80	4.50 per doz.

1522.—Ditto, ditto, Bohemian glass, entirely free from lead, flat top stoppers, fine cut and polished tops.

1	2	4	8	16	32 oz.
\$2.00	2.25	2.75	4.00	5.50	7.00 per doz.

1523.—Ditto, Tincture, German, hand-made top stoppers, accurately ground with fine emery, similar to No. 1524.

$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	6	8	12	16	32
.55	.65	.75	.90	1.00	1.25	1.50	1.75	2.25	2.50	4.50 per doz.

1524.—Ditto, ditto, French, each stopper accurately hand-made and double-ground with finest emery, so that no air can enter to injure the solutions stored in them; these bottles are made expressly for the laboratory, to hold choice reagents.



1516

1524

$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	6	8	12	16	32 oz.
.90	\$1.00	1.10	1.15	1.25	1.75	2.25	2.50	3.00	3.25	5.00 per doz.

1525.—Ditto, Tincture, French vitrified labels for Acids, Ammonia, Alcohol, etc., carefully stopped by hand, shape No. 1524.

$\frac{1}{2}$ pint.	pint.	quart.	$\frac{1}{2}$ gal.
.75	\$1.00	1.25	2.50 each.

Ditto, ditto, with engraved labels to order.

1526.—Ditto, ditto, French blue tinctures, or narrow mouth, with glass stoppers.

1 oz.	2	3	4	8	16	qt.
\$1.25	1.30	1.50	1.75	3.00	4.50	6.00 per doz.

1527.—Ditto, ditto, Bohemian, flat cut and polished tops.

4 oz.,	\$3.00	8 oz.,	\$4.25 per doz.
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1528.—Bottles, tubulated at foot and narrow mouth for corks.

Qts., .75 $\frac{1}{2}$ gal., \$1.00 1 gal., 1.25 each.

1529.—Ditto, Tincture, accurately ground top stopper, tubulated at foot for separations.

1 litre. 2 litres. 4 litres.
\$1.00 1.50 2.00 each.

1530.—Ditto, separatory, with accurately ground top stoppers, and stop-cocks carefully ground into the tubulature at foot, every joint nicely polished with ground emery, so that neither air nor fluids can escape when enclosed. Best French.

$\frac{1}{2}$ 1 2 4 8 litres.
\$3.50 3.75 4.75 6.25 9.50 each.

1531.—Ditto, separatory, consisting of separatory bottles and separatory funnel, joined by a rubber stopper.

1 litre, \$6.00 2 litres, 8.00 each.

1532.—Ditto, chlorine, of colored glass, carefully ground glass stopper, with glass cap fitted by ground glass joint, 1 litre capacity. Each, \$2.00

1533.—Ditto, for ether, white glass, with cap and ground stoppers

1 2 4 8 16 32 oz. capacity.
.25 .35 .40 .60 \$1.00 1.30 each.

1534.—Ditto, Woulff's small 2 neck, for weighing and fitting small apparatus. Per doz., \$6.00

1535.—Ditto, ditto, 3 necks. " 7.20



1534



1539



1541



1542



1543

1536.—Bottles, 2 necks, with round straight neck for rubber tubing, 12 oz. Each, \$1.00

1537.—Ditto, ditto, with centre neck for cork, 12 oz. “ 1.25

1538.—Ditto, Woulff's, Bohemian, 2 necks.

2	4	8	16	32	oz.	$\frac{1}{2}$ gal.
.40	.45	.50	.65	.90		\$1.30 each.

1539.—Ditto, ditto, with a tubulature, near bottom.

Quarts,	\$1.50	$\frac{1}{2}$ gal.,	2.25 each.
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1540.—Ditto, Woulff's Bohemian, 3 necks:

2	4	8	16	32	oz.	$\frac{1}{2}$	1	$1\frac{1}{2}$	gal
.45	.45	.60	.75	\$1.00	1.25	2.50	3.25		each.

1541.—Ditto, Woulff's French, 2 necks carefully sealed on with glass shoulders. These French Woulff bottles are never known to leak about the tubulature.

$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	1	2	4 litres.
.56	.75		\$1.00	1.40	2.50 each

1542.—Bottles, Woulff's French, 3 necks.

$\frac{1}{4}$	$\frac{1}{2}$	1	2	4 litres.
.65	.85	1.15	1.75	3.00 each.

1543.—Ditto, Woulff's French, 2 necks, with tubulature near foot.

1 litre, \$1.75	2 litres, \$2.50	4 litres, \$4.00 each.
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1544.—Ditto, ditto, 2 necks, stoneware, tubulature near bottom.

60 litres.	Each, \$60.00
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1545.—Bottle Caps, of flexible vulcanized caoutchouc. Price according to diameter. \$2.50 to 4.50 per doz.



1545

1546.—Bottle Imps, ordinary. Each, .25

1547.—Ditto, fine quality.

Each, .75

1548.—Ditto, with ear and balloon.


“ \$1.00

1549.—Bottle Brushes. See Brushes.

1550.—Boxes of black japanned tin for blow-pipe use in holding capsules, test tubes, etc. Each, .75



- 1551.**—Boxes, turned ivory, for $\frac{1}{2}$ oz. bottles. Per doz., .60
1552.—Ditto, including bottles. “ \$2.00
1553.—Ditto, boxwood, including bottles. “ 1.50
1554.—Ditto, of pasteboard, including bottles. “ 1.25
1555.—Ditto, fine turned rosewood, ivory trimmed, for tapers or bottles. Each, .25

1556.—Ditto, pasteboard, round English form, holding 2 grammes, useful for putting up ordinary reagents, pills, or small articles of jewelry. Per doz., .25  1556

1557.—Ditto, ditto, ordinary form, round, in nests of 5, Per doz. .25


1558.—Ditto, pasteboard, English form, extra quality, cherry lining, 2 grammes. Per doz. boxes, .25

1559.—Ditto, ditto, 4 grammes. “ .40

1560.—Ditto, ditto, 3 in a nest, 1's to 3's. “ .45

1561.—Ditto, ditto, 5 in a nest, 2's to 6's. “ .48

1562.—Ditto, ditto, 6 in a nest, 1's to 6's. “ .50

1563.—Ditto, for Lip Salve, plain. Per doz. boxes, \$1.00 

1564.—Ditto, with legend “Lip Salve.” “ 1.25 1563

1565.—Ditto, of best China porcelain, with wreath and legend, “Lip Salve.” Per doz., \$3.50

1566.—Ditto, ditto, rose and gilt, tipped. “ 2.50

1567.—Ditto, ditto, turned boxwood, flat form. “ 1.00

1568.—Ditto, ditto, turned rosewood, “ “ 1.25

1569.—Ditto, small dove-tailed pine wood.

3 x 3 x 15	3 x 3 x 20	12 x 12 x 30
.35	.40	\$1.00 each

1570.—Box Sieves, Griffin's, 3 partitions, used in connection with the blow-pipe. Each, \$2.50

1571.—Bologna Flasks, of thick unannealed glass, will bear a smart blow, but fracture when a hard angular body is dropped into them. Per doz., \$1.50

1572.—Bombs, see Candle Bombs.

1573.—Brass Jets, see Jets.

1574.—Brushes, fine, for Feather Tubes. Each. .25

1575.—Ditto, for ordinary Test Tubes. “ .10

1576.—Ditto, ditto, large ditto, ditto. “ .15

1577.—Ditto, ditto, extra large ditto, ditto, or Bottles. “ .20

(The above test tube brushes are all made of galvanized iron or copper, to prevent rust.)



- 1578.—**Brushes**, for bottles, patent tin handles. Each, .25
 1579.—Ditto, ditto, wood handles, large size. “ \$1.00
 1580.—Ditto, Camel's hair, for cleaning the button, in assay-
 ing. Each, .25
 1581.—Ditto, bristles, ditto. “ .50
 1582.—**Bubble Pipe**, of clay, with connecting piece of brass, for
 blowing hydrogen bubbles. Each, .40
 1583.—Ditto, ditto, of brass. “ .75



1583



1587



1588



1589

- 1584.—**Bulb Tubes**, in which ignited oxide of copper may be
 cooled; hard glass; small sizes. Per doz., .60
 1585.—Ditto, in which ignited oxide of copper may be cooled;
 hard glass; large sizes. Each, .10 to .25
 1586.—**Bungs**, of selected cork, from $\frac{3}{4}$ in. to 2 in. Doz. .20 to .70
 1587.—**Burettes**, Bink's, English form, with wooden foot.

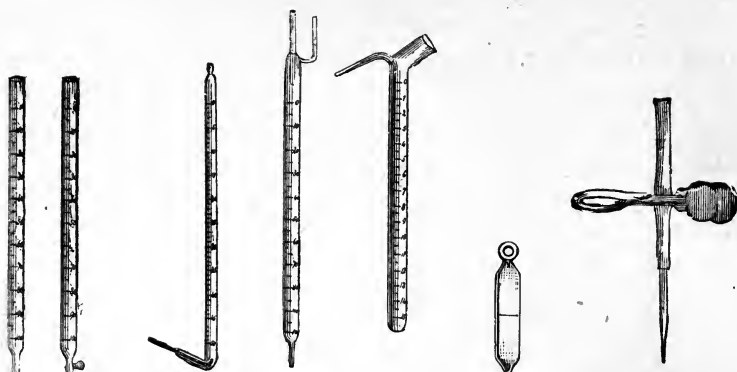
25	25	50	50	100 c. c.
$\frac{1}{5}$	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{10}$	$\frac{1}{2}$
\$1.50	1.75	1.75	2.25	2.25 each.

- 1588.—Ditto, Gay Lussac.

25	50	50	100	100 c. c.
$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{2}$
\$1.50	2.00	2.50	2.25	2.50 each.

- 1589.—Ditto, Geissler's, with ground glass stopcock running the
 whole length of tube and lateral tube for receiving fluids near
 the top.

25	50	100 c. c.
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{5}$
\$2.50	3.25	4.00 each.



1590 1591

1592

1593

1594

1597

1598

1590.—Burettes, Mohr's.

20 $\frac{1}{5}$	20 $\frac{1}{10}$	25 $\frac{1}{5}$	25 $\frac{1}{10}$	30 $\frac{1}{10}$	40 $\frac{1}{5}$	50 $\frac{1}{2}$	50 $\frac{1}{5}$
\$1.25	1.50	1.50	1.75	2.00	2.25	2.00	2.25
50 $\frac{1}{10}$	60 $\frac{1}{5}$	100 $\frac{1}{2}$	100 $\frac{1}{5}$	100 $\frac{1}{10}$	200 c. c. $\frac{1}{5}$		
\$2.50	2.50	2.50	2.75	2.75	2.00 each.		

1591.—Ditto, ditto, with glass stopcock.

25 $\frac{1}{5}$	25 $\frac{1}{10}$	50 $\frac{1}{5}$	50 $\frac{1}{10}$	100 $\frac{1}{2}$	100 c. c. $\frac{1}{5}$
\$2.25	2.50	3.00	3.25	3.50	4.00 each.

1592.—Ditto, for Chameleon process, with lateral tube, joined near the bottom.

25 $\frac{1}{10}$	50 c. c. $\frac{1}{10}$
\$1.75	2.25 each.

1593.—Ditto, Rammelsburg's, with lateral tubes, joined near the top, and sealed in to carry the test liquor, to avoid frothing.

25 $\frac{1}{5}$	50 c. c. $\frac{1}{5}$
\$1.50	2.00 each.

1594.—Ditto, Geissler's Chameleon, having a lateral tube running to the bottom.

25 $\frac{1}{10}$	50 c. c. $\frac{1}{5}$
\$2.00	2.50 each.

1595.—Burettes, Leslie's, see Leslie's Alkalimeters.**1596.—Burette Clamps.**

Each, .50

1597.—Burette Swimmers, or Erdmann's Float.

" .50

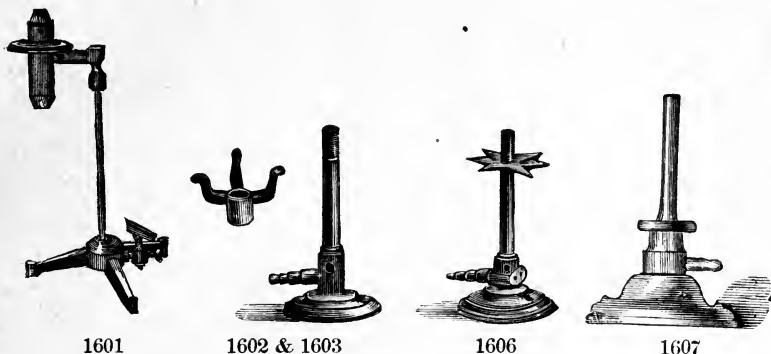
1598.—Burette Tips, with rubber attachments.

" .25

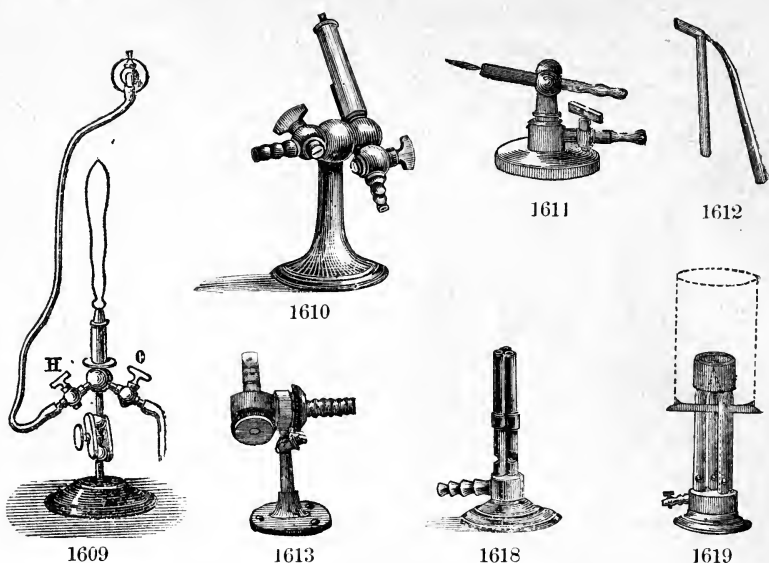
1599.—Burette Supports and Holders, see Supports.

BURNERS.

- 1600.**—Burners, Argand standard register, as used with Bunsen's Photometer. Each, \$4.00



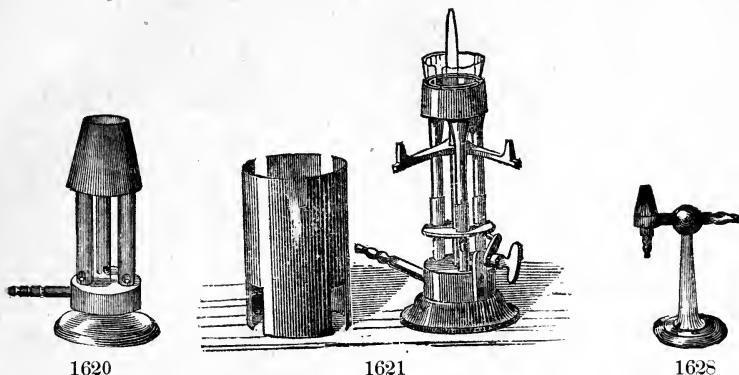
- 1601.**—Ditto, with flame apparatus, mounted on stand for spectral analysis or polarization of light. \$6.00
- 1602.**—Ditto, Bunsen's plain. Each, \$1.25
- 1603.**—Ditto, with tripod on top, to support evaporating dish. Each, \$1.75
- 1604.**—Ditto, ditto, with ring to regulate the flow of air into the burner, to produce at pleasure blue or yellow flame. Each, \$1.35
- 1605.**—Ditto, new French pattern with air regulator, consisting of lever attached to the receiving tube, which raises and lowers at pleasure a cap over the air-vent, and at same time graduates the flow of gas. Each, \$2.50
- 1606.**—Ditto, ditto, with two holes in base of Burner, to attach to retort stand, without star. Each, \$1.75
- 1607.**—Ditto, ditto, Bunsen's improved new style of Burner, having a ratchet regulator in place of the ordinary air regulator, dispensing with stopcocks, and graduating the flow of air and of gas at the same time. It is simple, compact, convenient and entirely new. Each, \$2.75
- 1608.**—Ditto, ditto, having one receiver with double tube for gas and air, regulated by one stopcock; and also having a lateral jet, regulated by stopcock. A new invention, and powerful. Each, \$7.50
- 1609.**—Ditto, ditto, French, with universal joint and stopcocks for



- the air and gas, for throwing the flame in horizontal or oblique directions. Each, \$10.00
- 1610.**—Ditto, Bunsen's blast, having the tubes for receiving gas and air at right angles, with different size tips for regulating the jet. Each, \$7.50
- 1611.**—Ditto, ditto, very small, for use in place of the mouth blow-pipe for producing a very fine taper flame. Each, \$5.00
- 1612.**—**Burner Attachment**, for producing a gas blast, consisting of two brass tubes terminating in one jet, one of which is placed in the delivery tube of the ordinary Bunsen burner, and the other connecting with the blowing machine. Each, \$1.00
- 1613.**—**Burners**, Bunsen's small blast, for fastening to the table, with one extra tip. Each, \$6.00
- 1614.**—Ditto, Bunsen's plain, with star and chimney. " 2.00
- 1615.**—Ditto, ditto, with star and porcelain plate to catch the ashes of the filter. Each, \$2.50
- 1616.**—Ditto, ditto, with star, chimney and plate to catch the ashes of the filter, and provided with a **thumb-screw at the base** to raise and lower the burner. Each, \$3.00
- 1617.**—Ditto, ditto, plain, with two tubes. " 2.00
- 1618.**—Ditto, ditto, plain, with three tubes. " 2.50
- 1619.**—Ditto, Babo, with three tubes formed into one circular.

opening at top, with star supporting a sheet iron chimney and stopcock to regulate the flame; also having a centre tube.

Each, \$9.50



1620.—Burners, Bunsen's, with three tubes and caps, arranged so that the flame touches every part of the crucible. Each, \$4.00

1621.—Ditto, Berzelius's, having a sliding cap with thumb-screw attachment, to regulate the flow of air without stopcock, otherwise the same as the foregoing. Each, \$7.50

(The two styles of Burners, Nos. 1619 and 1621, produce a solid circular flame with a centre flame, generating a high degree of heat.)

1622.—Ditto, Bunsen's, with four tubes. Each, \$3.00

1623.—Ditto, ditto, six tubes. " 4.00

1624.—Ditto, ditto, eight tubes. " 5.00

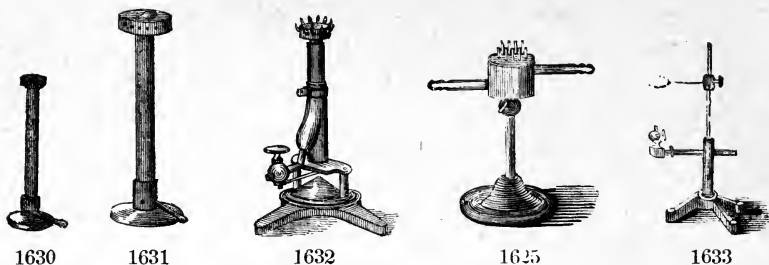
1625.—Burner, Griffin's Blast Gas, with nine tubes grouped together, giving a very powerful heat when attached to a blowing table and surrounded by a fire clay cylinder. Each, \$13.50

1626.—Burners, Bunsen's, French, with two tubes bent off in separate directions. Each, \$2.50

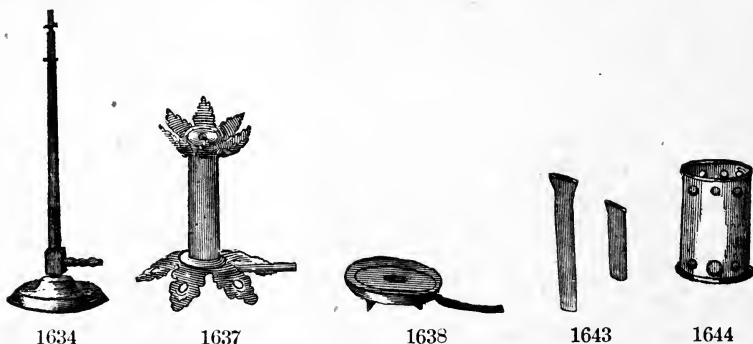
1627.—Ditto, ditto, with three tubes bent off in separate directions. Each, \$3.50

1628.—Ditto, Blast, terminating in six tips. 6.50

1629.—Ditto, Bunsen's, newly invented, consisting of seven Bunsen burners, arranged in a circle, each burner having a cap to spread the flame, all enclosed in a sheet-iron frame, which concentrates the heat, and, at the same time, supports the vessel to be heated. Each, \$12.00



- 1630.**—Burners, Crown or Rose, consisting of a common burner, having a cap with the sides pierced, through which small jets of flame pass out. Each, \$1.75
- 1631.**—Ditto, ditto, large size, or locomotive, producing a high degree of heat. Each, \$5.00
- 1632.**—Ditto, ditto, ditto, with a lever attached by which the flow of air and flame is regulated at the same time. A new invention. Each, \$10.00
- 1633.**—Ditto, Mendelsohn, for heating watch glasses. “ \$1.75
- 1634.**—Ditto, with long tube and ordinary gas tip. “ 2.00
- 1635.**—Ditto, Speestone, Bunsen's, single tube. “ 2.00
- 1636.**—Ditto, ditto, Rose's. Smaller, \$2.50; larger, \$3.00 each.

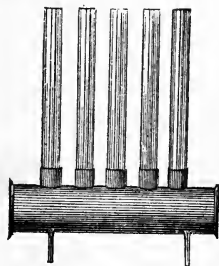


- 1637.**—Ditto, Vulcan, cast iron top and bottom, dispensing with the tripod. Each, .75
- 1638.**—Ditto, Sand, flat shape, consisting of a hollow iron frame filled with sand and cement, through which the gas exudes. Each, \$1.25
- 1639.**—Ditto, ditto, ditto, on tripod. “ 1.25
- 1640.**—Burner Forks, for holding burner when attached to a retort support. Each, .50

- 1641.—Burner Plates**, porcelain, for holding the ashes when filters are burned. Each, .75
- 1642.—Ditto**, tips, of silicated steatite for attaching to the ends of common gas burners. Each, .25 to .50
- 1643.—Ditto**, tubes, or jets with flattened ends to introduce into an ordinary Bunsen burner, to produce a flat flame. Each, .25
- 1644.—Ditto**, furnaces, porcelain, to surround the burner to increase the heat. Each, \$1.25
- 1645.—Burnishers of Agate.** “ 1.50
- 1646.—Bolt-head** experiment in Pneumatics. Apparatus for. Each, \$4.00
- 1647.—Bell** in vacuo. “ 4.00
- 1648.—Bursting Squares.** Per doz., \$2.50
- 1648.A—Colorimeter**, for examination of sugars and syrups, after Dr. Scheibler's method.



1649



1656



1661

- 1649.—Candle Bombs**, small glass bulbs, filled with colored water and sealed, which explode when heated. Per doz., .40
- 1650.—Caoutchouc**, unvulcanized, in sheets, for forming tubes, covering jars, etc., $\frac{1}{16}$ in. thick. Per square foot, .75
- 1651.—Ditto**, vulcanized, ditto, ditto. “ .70
- 1652.—Ditto**, Balls, pierced to attach to pipettes, syphons, etc., round and pear shape. Each, .50
- 1653.—Ditto**, caps, vulcanized, for fitting glass tubes to glass bottles, etc., 1, 2 and 3 tubes. Each, .20 to .40
- Ditto, Connectors. See Rubber Connectors.
- Ditto, Stoppers. See Rubber Stoppers.
- Ditto, Tubing. See Rubber Tubing.
- 1654.—Capillary Plates**, for showing the parabolic curve. Per set, \$2.00
- 1655.—Ditto**, Tubes, in sets unmounted. Each, .40

1656.—Capillary Tubes, mounted in japanned cistern. Per set, \$2.00

1657.—Ditto, Tubing, 5 feet lengths. Each, .10

1658.—Caps for bell jars, globes, etc., of brass.

Sizes, $\frac{3}{4}$ to 1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$ to $1\frac{1}{2}$	$1\frac{5}{8}$	2	$2\frac{1}{2}$ in.
.55	.60	.65	.70	.75	.80	.85 each.

1659.—Ditto, for gas bags, etc.

$\frac{1}{2}$	$\frac{5}{8}$	$\frac{7}{8}$ to 1 in. diameter.
.50	.55	.60 each.

Ditto, for deflagrating jars. See Deflagrating Covers.

1660.—Ditto, for galli pots, small jars, etc., silvered. Per doz., .10

1661.—Ditto, porcelain, for lamp chimneys, to economize and reflect the light.

Nos. 1	2	3	4
.50	.60	.75	.90 each.

1662.—Canules, French. Per doz., \$1.25

Capsules of glass. See Glass Evaporating Dishes.

1663.—Ditto, of horn.

$1\frac{3}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{4}$	$4\frac{1}{2}$	$5\frac{1}{4}$
.20	.24	.32	.36	.45	.56	.72	.88	\$1.07 per pair

Ditto, of iron. See Sand Baths.



1664



1667



1669



1672



1673

1664.—Ditto, ditto, transparent glazing inside, lipped.

Sizes, 5	6	7 in.
\$1.20	1.40	2.00 each.

1665.—Ditto, of platinum, sizes as required. Per oz. (gold), \$10.00

1666.—Ditto, of silver, sizes as required. " " 2.50

1667.—Ditto, of porcelain, nests of 5, without lip, glazed inside, similar to watch glasses, very shallow. Per nest, \$1.00

1668.—Ditto, ditto, 3 in nest. " .75

Ditto, ditto, French. See Evaporating Dishes.

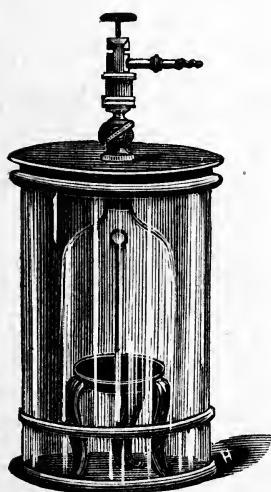
1669.—Ditto, ditto, with a sharp lip, nests of 4, very thin and transparent. Per nest, .80

1670.—Ditto, ditto, with rounding lip, nests of 4, with perpendicular sides and flat bottoms, about $\frac{3}{4}$ of an inch deep. Per nest, \$1.00

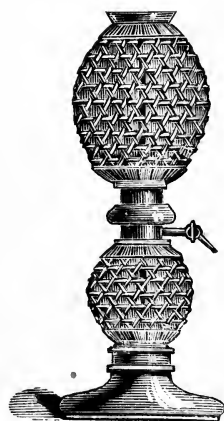
1671.—Ditto, round bottom, without lip, glazed throughout, about 2 inches in diameter across the top and deep. Per doz., \$2.50

1672.—Ditto, Plattner's, flat bottom and straight sides, holding about $\frac{1}{2}$ ounce, semi Berlin. Per doz., \$1.25

- 1673.—Capsules**, Plattner's flat bottom and oblique sides, holding about $\frac{1}{8}$ of an ounce. of fine Meissen porcelain. Each, .20
- 1674.—Ditto**, of porcelain, very small, for blow-pipe fusions, and of extra hard and tough porcelain. Per doz., \$1.20
- 1675.—Ditto**, half-egg form, of extra fine and thin porcelain, to sustain a high heat. Per doz., \$1.75
- Ditto, with handles. See Royal Berlin Casseroles:
- Ditto, other forms. See Digestors, Evaporating Dishes, Combustion Boats, etc.
- 1676.—Carbonic Acid**, liquified, in sealed barometer tubes, enclosed in velvet lined leather cases. Each, \$6.50
- Ditto, ditto, apparatus. See Potash Bulbs.
- 1677.—Carbons**, for Bunsen's and other batteries, of French graphite.
- | | | |
|----------|-----|-----------|
| Sizes, 6 | 7 | 10 in. |
| .40 | .50 | .75 each. |
- 1678.—Ditto**, flat, $\frac{1}{4}$ inch thick, 10 x 6 in. Each, .75
- 1679.—Ditto**, pencils, of pure graphite, for the electric light. Per inch, .6



1680

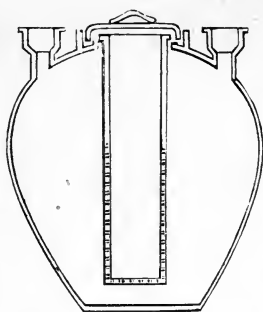


1681

- 1680.—Carbonic Acid Generator**, consisting of a glass jar, containing a bell-shape gas holder and leaden tripod. The gas is delivered through a gallows screw connector.

12	15	20 in. high.
\$10.00	15.00	20.00 each.

- 1681.—Ditto, Water Apparatus**, 1 quart capacity, made of glass covered with reed netting, porcelain foot. Each, \$7.50



1682



1686

1682.—Carboys of Earthen Ware, with filter, for the manufacture of chlorine. Each, \$10.00

1583.—Ditto, ditto, for the concentration of acid or ammonia.

60	100 litres.
\$10.00	12.00 each.

1684.—Carthesian Imps, ordinary, black. Each, .20

1685.—Ditto, ditto, fine quality. Each, .75 to \$1.00

1686.—Ditto, ditto, with jar, additional. Each, \$1.50

1686.A—Cases, to hold 6 bichromate battery cells. " 1.50

1687.—Caseroles, semi Berlin, ordinary form, with lip and straight-flattened handle, glazed inside and outside.

Sizes, No. 00	0	1	2	3	4
Price, .35	.50	.70	.85	\$1.00	1.35 each.



1687



1688



1690



1691

1688.—Ditto, deep, for coloring pots used in manufacturing jewelry.

Sizes, $5\frac{1}{2}$	$6\frac{1}{2}$	$7\frac{1}{2}$ in.
Prices, \$3.00	4.00	5.00 each.

1689.—Ditto, Royal Berlin, lipped, looped handle glazed inside and out, $1\frac{1}{2}$ ounce capacity each. Each, .40

1690.—Ditto, ditto, lipped and round porcelain handle.

1	2	3 oz.
.30	.35	.40 each.

1691.—Ditto, of finest French porcelain, glazed inside and out, except the bottom, having cover and wooden handle.

Nos. 5	4	3	2	1	1 extra.
\$1.00	1.25	1.50	2.00	2.25	4.00 each.

1692.—Caseroles, Meissen, glazed throughout, except the bottom, loop handle.

Nos	3	2	1
	.75	\$1.00	1.25 each.

1692.A—Cassolettes, Lubin's, of rosewood, for holding small quantities of perfume. Per doz., \$3.00

1693.—Cat Skins, for exciting electric apparatus. Each, \$1.00

1693.A—Caustic Holders, of ivory, with metallic ends. " 4.00

1694.—Cells, carbon, for fusion supports. " .50

1695.—Ditto, porous, French and German, imported.

2 x 4	2 $\frac{3}{4}$ x 4	2 $\frac{1}{4}$ x 5 $\frac{1}{2}$	2 $\frac{1}{4}$ x 6	2 $\frac{3}{4}$ x 7 $\frac{1}{2}$	3 x 8 in.
.12	.15	.20	.30	.45	.50

1696.—Ditto, ditto, sizes above, 3 x 8. Each, .75 to \$1.00

1697.—Ditto, oval microscopic of plate glass, 1 $\frac{1}{2}$ x 3 inches.

Each, .50 1695



1698.—Centimetre Measures, of boxwood, having centimetres on one side and English inches on the other. Each, .50

1699.—Ditto, ditto, of ivory, in millimetres, up to 5 centimetres.

Each, \$2.00

1700.—Ditto, ditto, of ivory, having English inches on one side and graduated up to 1 metre. Each, \$2.25

1701.—Charcoal Pieces, prepared for use in blow-pipe fusions.

4 pieces for .25

1702.—Ditto, Borers, Plattner's, of steel, with spatula handle.

Nos	1	2	3
	.30	.35	.40 each.

1703.—Ditto, ditto, with polished cocoa handles.

Nos	4	5	6
	.50	.60	.75 each.



1704.—Ditto, ditto, with eight points, with polished cocoa handles and brass ferule.

Nos	7	8	9
	\$1.00	1.20	1.25 each.

1705.—Ditto, Holder, with platinum attachment and wood handle. Each, \$3.25

1706.—Ditto, Saw, small. " .50

1707.—Ditto, ditto, large. " .75

1708.—Charcoal Spatula, steel, Plattner's, cocoa handle. Ea. .50

1709.—Ditto, Tongs, bent, 18 inches long, light weight.

Per pair, .75



1709



1710



1713



1714



1715



1716

1710.—Ditto, ditto, bent inwards, with the insides rasped and handles twine wound, for cold weather. Each, \$1.25

1711.—Ditto, Sticks, for breaking glass, according to size.

Per doz., .50 to .66

1712.—Chisels, of Steel, Plattner's, for clipping ingots. Each, .50

1713.—Chloride of Calcium Jars, on foot, with tubulature at side, near the bottom, for drying gases.

4	8	12	16	24	32 oz.
.65	.85	\$1.00	1.50	2.50	3.50 each.

1714. — Ditto, ditto,
Tubes, small, straight,
assorted. Each, .15

1715.—Ditto, ditto, 2 bulbs,
8 inch. Each, .25

1716.—Ditto, ditto, bent
ends. Each, .25

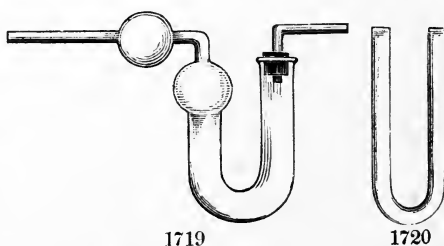
1717.—Ditto, ditto, large size; 12 to 16 inches. Each, .50

1718.—Ditto, ditto, straight, with small tubes inserted in a cork at either end. Each, .20

1719.—Ditto, ditto, Marchand's, U shape, with connecting tube. Each, .50

1720.—Ditto ditto, U shape, plain.

6	8	10 inch.
.30	.50	.60 each.



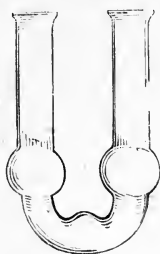
1719

1720

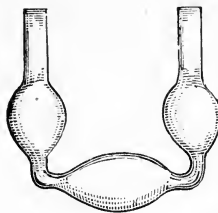
- 1721.—Chloride of Calcium Tubes**, in setts of 3, each forming around the other. Per set, .75



1722



1723



1727

- 1722.**—Ditto, ditto, ditto, with 3 bulbs, small.
4 to 5 inches. 8 in.

.40

.75 each.

- 1723.**—Ditto, ditto, U shape, Fresenius' form, 2 bulbs in each limb, and half-bulb in connecting tube.

Each, .75

- 1724.**—Ditto, ditto, U shape, with drip in the centre.

Each, \$1.00

- 1725.**—Ditto, ditto, with stopcock in the drip.

Each, \$3.50

- 1726.**—Ditto, ditto, V form, 9 inches high.

Each, .60

- 1727.**—Ditto, ditto, Weeber's, U form, having 3 large bulbs.

Each, .75

- 1728.**—**Charts**, colored, showing the spectra of stars and metals, according to Kirchhoff and Bunsen. Size, 28 x 40 Each, \$3.25

- 1729.**—Ditto, ditto, in sets of 3.

9.00

- 1730.**—Ditto, of snow crystals, showing the different forms assumed by frozen vapor. Size, 24 x 36.

Each, \$4.00

- 1731.—Chlorine Gas Generating Apparatus**, consisting of glass flask, safety funnel, and delivery tube.

pts.
.90qts.
\$1.10 $\frac{1}{2}$ gal.
1.35 each.

- 1732.**—Ditto, ditto, with wash bottle.

pts.
\$1.15qts.
1.35 $\frac{1}{2}$ gal.
1.90 each

- 1733.**—Ditto, ditto, apparatus for generating, consisting of lamp, pneumatic trough, iron stand, flasks, sand bath, etc.

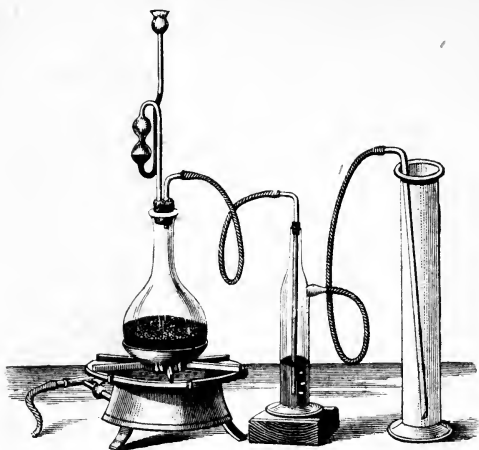
Each, \$10.00



1730



1712



1734



1736

1734.—Chlorine Gas Apparatus, Silliman's method. Each, \$6.00

1735.—Ditto, absorbing apparatus, Bunsen's, for use in volumetric analysis, as described in Mohr's titrir method, exclusive of stand and lamp. Each, .75

1736.—Ditto, ditto, Bunsen's style. " .75

1737.—Ditto, ditto, Mohr's, without jar. " \$1.25

1738.—Ditto, Meter, Descroizelle's, graduated in 100 c.c. " 2.50

1739.—Ditto, ditto, Gay Lussac, graduated in 100 c.c. " 2.50

1740.—Ditto, ditto, Mohr's. " 1.25

1741.—Ditto, Bottles, of cobalt glass, 1 litre, with glass cap, and tightly-fitting joint. Each, \$2.00

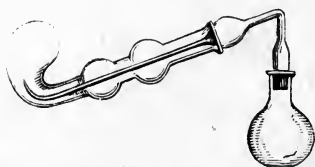
1742.—Ditto, Jar, stout glass for burning substances in chlorine. Each, \$3.00 to 5.00

1743.—Ditto, Safety Pipette, according to Mohr, with safety tube, rubber tube, and pinch-cock.

Each, \$1.00

Ditto, Gas Bottles. See Gas

Bottles.



1744

1744.—Ditto, Distilling Apparatus, for distillation of chlorine and iodide of potassium, according to Fresenius. Each, \$1.00

1745.—Ditto, ditto, according to Mohr, consisting of two flasks, connecting tube, safety tube, and stopcock. Each, \$1.50

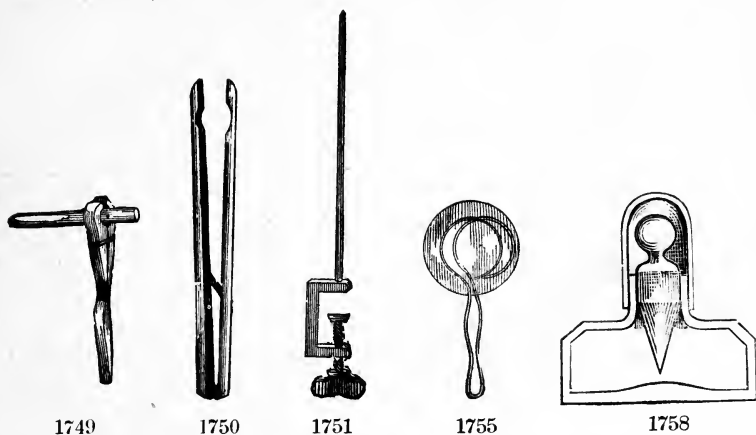
1746.—Chime, of 2 bells. " 2.50

1747.—Chime, of 3 bells.

Each, \$3.25

1748.—Ditto, of 5 bells.

“ 5.00



1749.—Clamps, wooden, for holding test tubes in the flame.

Each, .20

1750.—Ditto, larger, with a spring for holding larger tubes. “ .50

1751.—Ditto, heavy iron, with rod to attach to the counter. “ \$1.00

1752.—Ditto, in sets, with cork, lined jaws. Per pair, 3.00

1753.—Ditto, smaller, of iron, to attach to a retort stand, also having cork-lined jaws. Each, \$1.25

1754.—Ditto, for watch glasses, Dr. Craig's form. “ .20

1755.—Ditto, ditto, Hoffman's form. “ .20

1756.—Ditto, ditto, Mohr's form.

3	4	5	6 in.
.25	.30	.35	.40 each.

1757.—Ditto, for holding hot test tubes, metallic, with wooden handle. Each, .50

Ditto, for batteries. See Binding Clamps.

Ditto, wooden, for burettes, pipettes, retorts, etc. See Supports.

Clay Supports. See Crucible Supports.

1758.—Cobalt Bottles, with cap and long stopper, German glass.

$\frac{1}{2}$	1 oz.
.35	.50 each. See also Acid Bottles.

Ditto, Glasses, used in testing colored flame. See Colored Glasses.

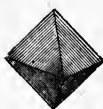
Coddington Lenses. See Lenses and Loups.



1759



1760



1759.—Coffee Machines, glass and porcelain, French.

Each, \$7.50

1760.—Ditto, ditto, porcelain, German, for preparation of coffee for the table, by infusion. A very highly prized apparatus by those who use it.

Nos. 3

\$3.50

4

4.50

5

6.00 each.

Coils, Ruhmkorff's. See Electrical Coils.

Colanders. See Straining Dishes, Baskets, Filters, etc.

1761.—Collection of Crown Diamonds, glass models, consisting of Kohinoor and three others of the royal diamonds, in a nice velvet lined, morocco case. Each, \$20.00

1762.—Ditto, of artificial gems, showing the form of crystalization of the precious stones; also, the different styles in which diamonds are cut, in a velvet-lined mahogany box. Each, \$20.00

1763.—Ditto, of glass crystals, in a velvet-lined box. " 15.00

1764.—Ditto, of crystallographic, models in wood *W. se's*. 104 pieces, Each, \$20.00

1765.—Ditto, ditto, smaller, 34 pieces. " 9.00

1766.—Ditto, ditto, primary forms.

1767.—Ditto, ditto, of glass, with strings, for showing their axes.

1768.—Ditto, of 10 rare specimens for spectral analysis, with tubes having platinum ends, in a highly polished case of boxwood. Complete. Per set, \$7.50

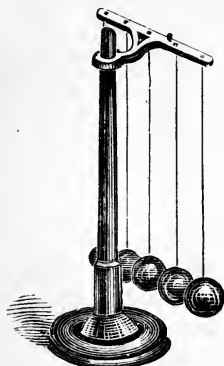
1769.—Ditto, of objects for examination by the solar microscope, mounted, on cork. \$25.00

1770.—Collection of Nitrogen disengaged during combustion of organic bodies. Simpson's apparatus for. .75

Collections of apparatus. See the latter part of this book.

Ditto, of minerals, fossils, etc. See Minerals.

1771.—Collision Balls, set of 6 ivory balls, mounted on mahogany frame, graduated arc. \$20.00



1772



1778



1776

1772.—Ditto, ditto, set of 5 balls, of hard wood, mounted. \$3.50

Collodion Balloons. See Balloons.

1773.—Colored Glasses, for fancy glass blowing, in rods about 3 feet long. Each. .25

1774.—Ditto, Glass Plates, used in testing colored flame.

Size, 3x3	4x4	5x5 inches.
.15	.20	.25 each.

Color Tests. See Tests papers.

1775.—Color Test Slab, of porcelain, having 12 cavities: $4\frac{1}{4}$ x $2\frac{1}{2}$ inches. Each. .75

1776.—Combustion Boats or Capsules, of porcelain.

$2\frac{3}{4}$ to 3	$3\frac{1}{4}$ to 4	6 in.
.20	.30	.50 each.

1776.A—Ditto, ditto, of platinum. Price, per grain. .3

1777.—Combustion Furnace, Storers, consisting of 2 tubes, surrounded by a sheet-iron frame, having the top covered with wire gauze. Each. \$1.50

1778.—Ditto, Liebig's, as improved by Stenhouse, of sheet iron, for use with charcoal.

Length, 18 in., \$2.75	24 in., \$3.25.
------------------------	-----------------

1779.—Ditto, Bunsen's, having 25 burners. Imported. Each. \$60.00

1780.—Ditto, American. " 50.00

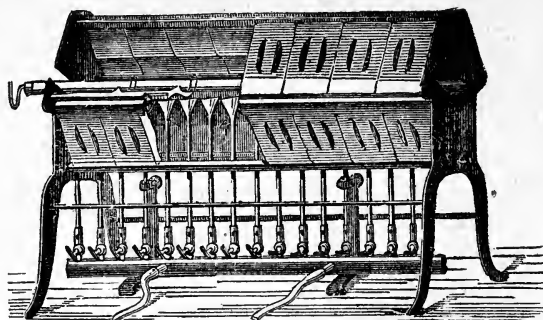
1781.—Combustion Furnace, French, having 10 burners.Each,
\$30.00

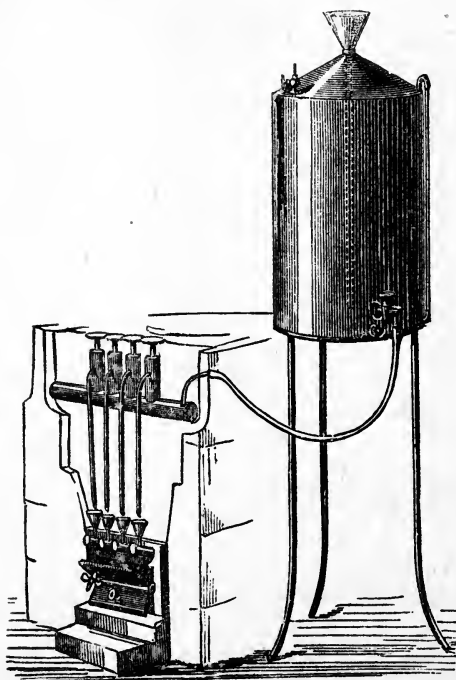
Fig. 4.

1781

1782.—Ditto, ditto, for use with coal oil, as invented and employed by St. Clair Deville, with one burner, dropping tube and doors to set in for a draft, (without tank.) Each, \$12.00

1783.—Ditto, ditto, with 2 burners. “ “ 18.00

1784.—Ditto, ditto, with 3 “ “ 22.00



1785

1785.—Ditto, ditto, with 4 burners.

“

Each, \$30.00

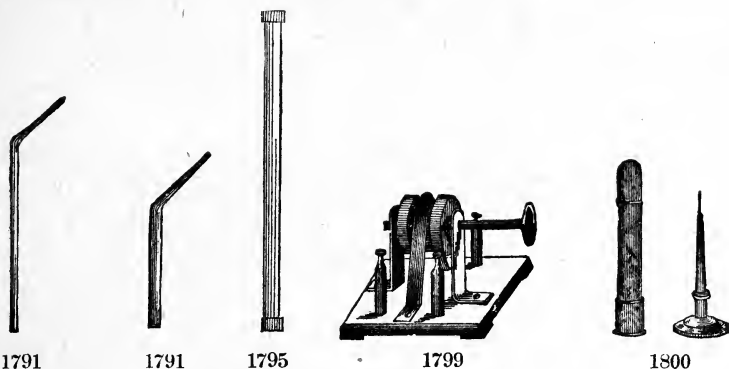
1786.—Combustion Furnace, ditto, of St. Clair Deville, with 5 burners, without tank. \$40.00

1787.—Ditto, ditto, tank for oil. Each, \$25.00

1788.—Ditto, Lamps. See Combustion Furnaces with gas

1789.—Ditto, Foil of Copper, for enveloping the tube in organic analysis. Per ounce, .5

1790.—Ditto, Tubing, of genuine hard, infusible Bohemian glass. (For sizes, see Glass Tubes.) Per lb., \$1.25



1791.—Ditto, ditto, $\frac{1}{2}$ to $\frac{5}{8}$ in. diameter, drawn to a point and bent for Liebig's furnace. 18 24 in.
.40 .50 each.

1792.—Ditto, Tubes, of best infusible Bohemian glass, sealed at one end, for nitrogen determinations. 18 24 in.
.35 .45 each.

1793.—Ditto, ditto, porcelain, straight, $\frac{1}{4}$ inch bore. Each, .50

1794.—Ditto, ditto, fine French, $1\frac{1}{2}$ in. bore. " \$1.50

1795.—Ditto, ditto, Meissen porcelain, flanged at both ends, and glazed inside.

$\frac{3}{8}$ 1 2 in. diameter.
.75 \$1.00 2.00 each.

1796.—Ditto, Bricks, of fire clay, for use with Bunsen's furnace. Each, .20

1797.—Ditto, Supports, for the trough. " .10

1798.—Ditto, Troughs, of fire clay, for supporting the tubes, 6 to 8 in. long. Each, .20

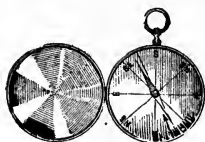
1799.—Commutators, or pole changers, for reversing the electric current. Each, \$9.00 to 15.00

1800.—Compasses, mounted on brass stands, swung on agate

- ✓ pivots, resting on fine steel points, with polished wooden cases for carrying them. Each, \$2.50



1801



1803



1806

- 1801.**—Compasses, plain, steel bearings. Each, .75

- 1802.**—Ditto, brass cases, with spring stop and agate bearing.

No. 1, \$1.00

No. 2, \$1.50 each.

- 1803.**—Ditto, watch form.

No. 4, \$3.50

No. 3, \$4.00 each.

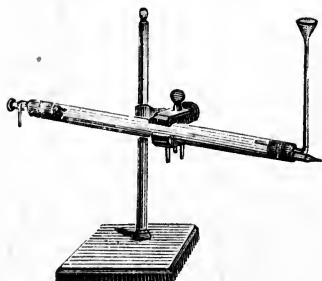
- 1804.**—Ditto, ditto, finer graduation, an accurate registry, enclosed in brass cases, with cover, especially for geologists. Each, \$6.00

- 1805.**—Ditto, ditto, German silver. " 6.50

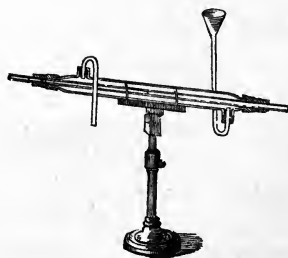
- 1806.**—Ditto, ditto, mineralogical, mounted, as above, with a sliding and swing indicator, showing the angle of the drip. Each, \$15.00

- 1807.**—Ditto, ditto, very fine Geological, German silver-mounted watch case, hung on agate, with a spring top, having also a sun dial arrangement, with universal meridian and registered meridian of chief cities in United States and Europe. Ea. \$27.50

- 1808.**—Compound Bar, for showing the expansion and contraction of two metals joined together, under the influence of extremes of temperature. Each, \$1.00



1809



1810

- 1809.**—Condensers, Liebig's form, of glass, small, unmounted.

Each, \$1.00

- 1810.**—Ditto, ditto, large, mounted.

" 2.00

1811.—**Condensers**, Liebig's form, japanned tin. Ea. \$3.50

1812.—Ditto, brass soldered, mounted on stand. " 6.00

1813.—Ditto, ditto, brazed, with movable joints, sliding rod, glass tube, fitted, etc., complete. Each. \$7.50

1814.—Ditto, V form, with small tube fitted into each opening, with a rubber stopper Each. .50 to \$1.00

1815.—Ditto, electrical, Riess's, for frictional electricity, and showing the theory of electrical condensers. Fa. \$20.00

Caustic holder. See No. 1693A.

1816.—**Condenser**, Schöber's, new German invention.



1817



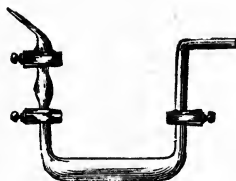
1819



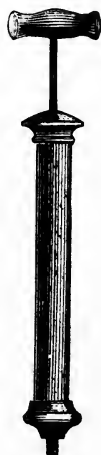
1821



1818



1820



1822

1817.—**Condensing Tubes**, with two stopcocks, as per illustration; the wide part $\frac{7}{8}$ of an inch in diameter.

Each, \$3.00

1818.—Ditto, ditto, with stopcock on the bend. " 3.00

1819.—Ditto, ditto, straight, with 3 stopcocks, as per illustration Each. \$4.00

1820.—Ditto, ditto, U form, with two of the stopcocks on one limb, and one on the other, so that the liquid can be drawn off in small portions. Each, \$4.00

1821.—**Condensing Chamber**, for use with air-pump, with movable interior tube, etc. Each, \$9.00

1822.—**Ditto, Cylinder**, with stopcocks, complete, size, 7 x $1\frac{1}{4}$ in. Each, \$9.50

1823.—Ditto, or boiling flasks, with lateral bent tube, as used in connection with Liebig's condenser, for boiling small quantities of liquids.



1823

1
.15

2
.18

3 oz. capacity.
.20 each



1693A

1824.—Condensing Worm, of block tin, enclosed in a zinc tub, used for distilling water, etc., according to size.

Each, \$2.50 and upwards.

1825.—Ditto, ditto, of glass, enclosed in a glass receiver. Each, \$1.75

1826.—Ditto, ditto, with iron support. " 3.00

Ditto, Pumps. See Pneumatic Pumps.

1827.—Conduction of Heat, downwards, slowly in fluids, apparatus for showing. Each, \$2.50

1828.—Conductometer, for illustrating the comparative power of different metals for conducting heat. Each, \$2.50

1829.—Cones, dissected. " 2.50

1830.—Cone of Platinum, for supporting the filter in Bunsen's method of rapid filtration. Price, .75



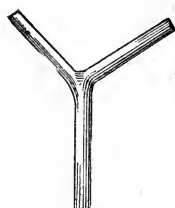
1831



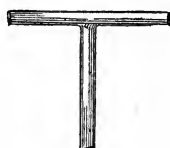
1831



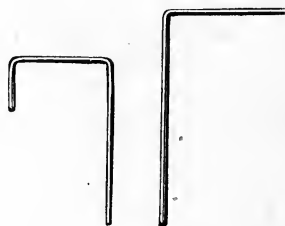
1832



1833



1834



1835

1831.—Connecting or Drying Limb, Mitscherlich's or Liebig's.

Each, .35

1832.—Ditto, Tube, for nitrogen apparatus. " .50

1833.—Ditto, ditto, of glass, or three way tubes, Y shape. " .25

1834.—Ditto, ditto, with three openings, T shape. " .25

1835.—Ditto, Tubes, bent at different angles. " .15

1836.—Ditto, ditto, with two or three lateral tubes. " .50

1837.—Connectors of Brass, with male and female screws.

Each, .35



1837



1838



1839

1838.—Ditto, ditto, with double male screw, without stopcock.

Each, .35

1839.—Ditto, ditto, with double female screw, without stopcock. (See also stopcocks and bladder pieces.) Ea. .30

Connections, for batteries. See Binding Screws and Clamps.

1840.—Connectors, gallowsscrew, Hare's. Each, \$1.00

1841.—Ditto, unvulcanized rubber, 2 in. long.

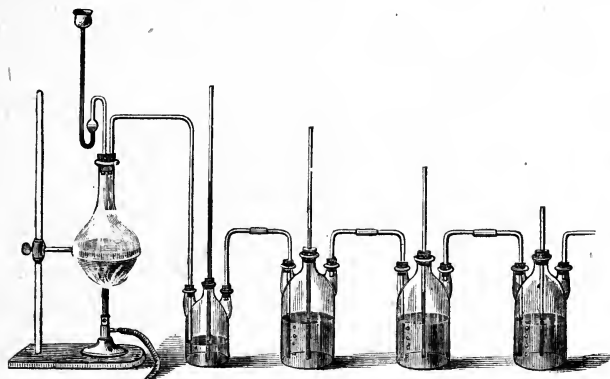
$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$ in. bore.
.40	.50	.60 doz.

1842.—Connectors, vulcanized rubber.

$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$ in.
.25	.30	.40	.45	.55 per doz.



1840



1854

APPARATUS FOR MAKING CHLORINE.

1843.—Cooper's Mercurial Receiver. Each, .50 to .75

Copper Foil. See Combustion Foil.

1844.—Ditto, Sheet, for galvanic experiments. Per lb., .50

1845.—Cork Teats. Per doz., \$2.00

Corks, rubber. See Rubber Stoppers.

1846.—Ditto, champagne. " \$6.00

1847.—Ditto, velvet, long and small. " .10

1848.—Ditto, chemical, carefully selected.

Nos. 0 to 5	5	6	7	8	9	10
.06	.07	.08	.10	.11	.13	.16 per doz.
$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$
.18	.20	.22	.25	.31	.35	.41
$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$	2 in.			
.50	.55	.60	.65 per doz.			

1849.—Ditto, extra large and flat. Per doz., .75

1850.—Cork Borers, set of 12, each borer having a handle of ordinary brass. Per set, \$4.00

1851.—Ditto, ditto, set of 12, each best German make. 1850

$\frac{1}{8}$ $\frac{1}{16}$ $\frac{1}{4}$ $\frac{1}{8}$ $\frac{3}{16}$ $\frac{1}{2}$ $\frac{3}{8}$ $\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{4}$ $\frac{1}{2}$ $\frac{1}{16}$ in. diam'r. Per set, \$4.50



1852.—Cork Borers, set of 6. Each, \$2.25

1853.—Ditto, ditto, set of 3. " 1.10

The ordinary quality not kept in stock; the above are of the very best hardened brass.

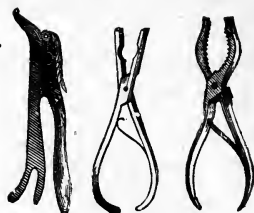
1854.—Ditto, ditto, of steel, wooden handle.

$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{3}{8}$ in.
\$1.50	1.70	1.80	2.00 each.

Ditto, **Files**. See round files and rasps.

1855.—Ditto, **Knife**, for cutting corks.

Each, .25



1856.—Ditto, **Pressers**, of cast iron. " .50

1857.—Ditto, ditto, of steel, usual style.

Each, \$1.00

1858.—Ditto, ditto, with fine teeth and extra nib. " 1.25

1859.—Ditto, ditto, heavier. " 1.00

1860.—Ditto, **Screws**, for pocket. " .25

1861.—Ditto, ditto, larger, with wood handles. " .40

1862.—Ditto **Lined Tongs**, of steel, for holding hot tubes.

Each, \$1.25



Cotton lamp-wick. See Wicks.

1863

1863.—**Covers**, convex, of glass, for covering Beakers, etc.

3	3½	4	4½	5	6 in.
\$2.50	3.00	3.50	4.00	5.00	6.00 per doz.

1864.—Ditto, glass, flat.

2	2½	3	4	5	6 in.
.50	.75	\$1.00	1.25	1.50	2.00 per doz.

Single covers, 20 per cent. higher.

1865.—A full set of ditto, one each size. .65

1866.—Ditto, ditto, with a hole in the side, for stirring rod.

2	2½	3	4	5	6 in.
.75	\$1.00	1.25	1.50	2.00	2.50 per doz.

Single covers the same style, 20 per cent. higher.

1867.—Ditto, with a hole bored in the centre, to receive a funnel

3	4	5	6 in.
\$2.00	2.50	3.00	3.50 per doz.

Single ones, 20 per cent. higher.

1868.—Ditto, flat, round French plate glass, 2 in. Each, .25

1869.—Ditto, flat, square, ground glass.

2	4	5	6	7	8	9	10 in.
.40	\$1.00	1.50	2.00	2.40	3.00	3.25	4.00 each.

Single glasses, 10 per cent. higher.

Ditto, other, flat. See glass plates.

1870.—Covers, glass, with knob, useful for covering choice specimens or small apparatus when laying on the table.



$\frac{4}{.50}$

7 in.
.75 each.

1870

1871.—Ditto, microscopic, very thin glass, cut in circles.

Per doz., .35; per ounce, \$4.00

1872.—Ditto, ditto, cut in squares. “ .30; “ \$3.00

1873.—Cremometer, Chevalier, with jar and thermometer.

\$1.50

1874.—Ditto, Quevenne, with jar and thermometer. 1.00

1875.—Ditto, glass foot, graduated, 0 to 12. .60

1876.—Crucibles, assay of unglazed porous clay, American.

Per doz., \$1.00



1877

1877.—Ditto French, unglazed white porous clay. doz. \$2.50

1878.—Ditto, Beaufay, French, soft, nearly white material, tall, narrow form, with spout, used for fluxing pots and for fusing enamel.

NO.	HEIGHT.	WIDTH.	PRICE.
1	2	$1\frac{3}{8}$	\$0.05 each.
2	$2\frac{1}{8}$	$1\frac{3}{8}$	.05 “
3	$2\frac{3}{4}$	$1\frac{1}{2}$	.07 “
4	$3\frac{1}{8}$	2	.09 “
5	$3\frac{3}{4}$	$2\frac{1}{8}$	.10 “
6	$4\frac{1}{2}$	$2\frac{1}{4}$	.12 “
7	$4\frac{3}{4}$	$2\frac{3}{8}$	.16 “
8	5	$2\frac{5}{8}$	.20 “
9	$5\frac{1}{8}$	3	.22 “
10	6	$3\frac{1}{2}$	.25 “
12	7	4	.50 “
14	$8\frac{1}{2}$	$4\frac{3}{8}$	.75 “
16	$10\frac{1}{2}$	$5\frac{1}{2}$	1.30 “
18	12	$6\frac{1}{2}$	2.00 “

1879.—Crucible, Beaufay covers, round.

$1\frac{3}{4}$ to 3 4 to 6 in.
.04 $\frac{1}{2}$.08 each.

1880.—Ditto, ditto, triangular, assorted sizes

Each, .06

1881.—Crucibles, iron, with covers, 3 to 5 ounces.

Each, \$1.00

1882.—Crucibles, plumbago, or black lead,



.878



1880



1879

round, with lip suitable for the fusion of the most refractory metals, gold, silver, brass, steel, iron, glass, etc., not subject to crack, and may be used repeatedly for most metals.

Nos. 1 2 3 4 6 7 8 10 12 14 16 18 20
 .20 .25 .30 .35 .45 .50 .55 .75 \$1.00 1.15 1.31 1.47 1.63 ea.

1883.—Crucibles, Plumbago, covers, Nos. 1 to 4.

Each, .10

Above No. 4, .02 extra, each number.

1884.—Ditto, cast iron.

$\frac{1}{2}$ pt.
 \$2.50

pts.
 2.75 each.



1882

1885.—Ditto, porcelain, from the Royal Berlin factory, with covers, glazed inside and out, except the bottom, uniform thinness.

NO.	DIAMETER.	CONTENTS.	PRICE.
000	1 inch.	$\frac{1}{8}$ ounce.	\$0.10 each.
00	$1\frac{1}{4}$ "	$\frac{1}{4}$ "	.15 "
0	$1\frac{1}{2}$ "	$\frac{3}{8}$ "	.25 "
1	$1\frac{3}{4}$ "	$\frac{1}{2}$ "	.30 "
2	$2\frac{1}{4}$ "	1 "	.40 "
3	$2\frac{1}{2}$ "	2 "	.50 "
4	3 "	4 "	.60 "
5	$3\frac{1}{2}$ "	8 "	.75 "

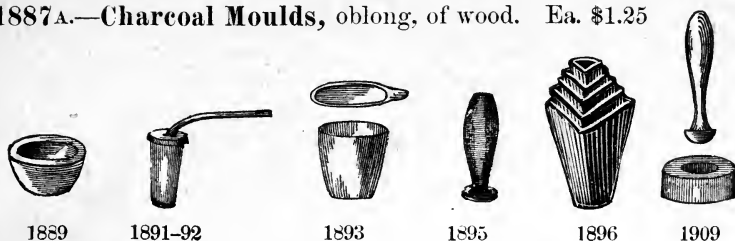
1886.—Crucibles, Meissen, tall form, with covers, glazed throughout.

NO.	DIAMETER.	DEPTH.	CAPACITY.	PRICE.
10	$\frac{5}{8}$ inch.*	$\frac{1}{2}$ inch.	15 grains.	\$0.10 each.
9	1 "	$\frac{3}{4}$ "	40 "	.13 "
8	$1\frac{1}{8}$ "	$\frac{7}{8}$ "	$2\frac{1}{2}$ drachms.	.16 "
6	$1\frac{5}{8}$ "	1 $\frac{3}{8}$ "	$6\frac{1}{2}$ "	.20 "
5	$1\frac{3}{4}$ "	$1\frac{1}{2}$ "	$1\frac{3}{8}$ ounce.	.26 "
4	$2\frac{1}{4}$ "	$1\frac{7}{8}$ "	2 "	.32 "
3	$2\frac{1}{2}$ "	2 "	3 "	.40 "
2	$2\frac{3}{4}$ "	$2\frac{3}{8}$ "	4 "	.50 "
1	3 "	$2\frac{5}{8}$ "	6 "	.75 "

1887.—Crucibles, unglazed, semi-porcelain, round, tall, with lip and covers.

Nos. 1 2 3 4 5 6 7 8 9 10 11
 Capacity,
 Price, .15 .20 .25 .35 .40 .45 .55 .65 .75 .85 \$1.00 each.

1887A.—Charcoal Moulds, oblong, of wood. Ea. \$1.25



1888.—Crucibles, full nests of the above, as 1887. Each, \$5.00

1889.—Ditto, glazed, porcelain, flat bottom, with covers.

6	8	12	16 oz.
.40	.45	.55	.65 each.

1890.—Ditto, unglazed, biscuit ware, conical form, perforated cover and gas reduction tube.

Nos. 2	1
.40	.50 each.

1891.—Ditto, conical form, of biscuit, flat bottom, and flat cover, perforated to permit the escape of gases, used for fusing nitrate of silver.

$1\frac{1}{2}$	$1\frac{3}{4}$ in.
.25	.30 each.

1892.—Ditto, tubes, for the above. Each, \$1.25

1893.—Ditto, Platinum, of the best French hammered, which is generally conceded to be superior to the English in quality.

$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	2 oz.
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According to quantity.

Per gramme, .40 to .45

1894.—Ditto, Silver, 2, 4, 6, 8 ounces. Per oz., \$5.50

1895.—Ditto, Metallurgists, or poellons, of fire clay. Each, .20

1896.—Ditto, Sand, or Hessian, in nests, small fours. Per nest, .05

1897.—Ditto, ditto, small fives. " .05

1898.—Ditto, ditto, large fours. " .14

1899.—Ditto, ditto, large fives. " .15

1900.—Ditto, ditto, round sixes. " .20

1901.—Ditto, ditto, triangular sevens. " .30

1902.—Ditto, ditto, ditto, eights. " .35

1903.—Ditto, ditto, single No. 8. Each, .25

1904.—Ditto, single French No. 7. " .25

1905.—Ditto, ditto, No. 4. Per 100, \$10.00

1906.—Crucible Covers, sand or hessian, small. Each, .10

1907.—Ditto, ditto, large, round. " .40

1908.—Crucibles, roasting.

Per doz., .75

1909.—Crucible Moulds, of boxwood, for making charcoal crucibles, for quantitative blow-pipe assays.

Each, .75



1910



1911



1912



1914



1915



1916



1917

1910.—Ditto, ditto, Plattner's, of brass, in four pieces, for making small crucibles of clay.

Each, \$4.25

Capsules, blow-pipe. See Mixing Capsules.

1911.—Crucible Supports, of fire clay, for supporting crucibles in a furnace, to keep them at a distance from the grate.

Each, .16

Ditto, Tongs. See Tongs.

1912.—Cryophorus, Wollaston's, double bulb.

\$2.00

1913.—Ditto, ditto, smaller, or single bulb.

1.75

1914.—Crystal Drainers, conical.

3	4	5 in.
.50	.55	.75 each.

1915.—Ditto, ditto, hemispherical.

3	4	5	6 in.
.30	.40	.50	.70 each.

1916.—Crystallizing Dishes, of glass, on three glass feet.

3	3½	3¾ in.
.50	.60	.75 each.

1917.—Ditto, ditto, round, of thin Bohemian glass, flat bottom, with perpendicular sides, in nests of 9.

Per nest, \$2.00

In nests of 4, the smallest.

" .75

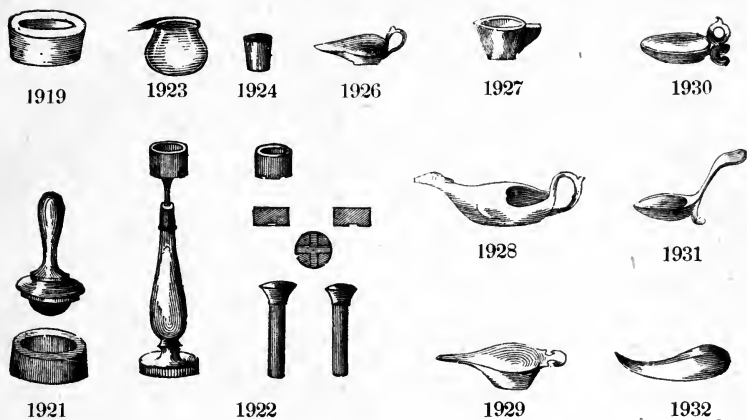
1918.—Crystallizing Dishes, of porcelain, large oval shape, with cover.

Each, \$5.00

Crystallizing ditto. See flat bottom evaporating dishes.

Crytallizing Kettles. See kettles.

Cubic Centimetre Flasks. See Litre flasks.



1919.—Cupels, of pure French bone-ash, from the same manufacture as those used in the French mint: each cupel being carefully wrapped in cotton, and then enclosed in paper.

Nos. 1	2	3	4	5	6	7	8
$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{5}{8}$ in.
Price, .35	.45	.50	.60	.75	.95	\$1.25	2.25 per doz.

1920.—Cupel Holders, or Trays, of iron, containing 12 partitions for holding cupels when several assays are under examination.

Each, \$1.00

1921.—Ditto, Moulds, of brass, used in forming the cupel.

Up to No. 5, \$2.50; larger, \$3.50 to 5.00

1922.—Ditto, ditto, of steel, Plattner's, for cupellation before the blow-pipe, consisting of two cupel moulds, different sizes, with corresponding pestles and a support; the cupels are exposed to the flame upon the moulds.

Each, \$2.75

Ditto, Furnace. See Furnaces.

1923.—Cupping Glasses. French.

Per doz., \$1.25

1924.—Cups, annealing, American.

" 1.00

1925.—Ditto, ditto, French.

" 2.50

1926.—Ditto, porcelain, for feeding the sick and infants, plain.

Per doz., \$2.50

1927.—Ditto, ditto, stout.

" 3.00

1928.—Ditto, ditto, covered, and swan neck.

" 4.50

1929.—Ditto, for medicine, small.

" 3.00

- 1930.—Cups for Medicine, larger. Per doz. \$3.50
 1931.—Ditto, ditto, mounted on feet. “ 6.00
 1932.—Ditto, ditto, scoop shape. “ .75



1933



1940



1941



1942



1943

- 1933.—Ditto, for Seidlitz's powders, of porcelain, having two partitions, one side to receive the acid and the other the salts, so that they become mixed in drinking or pouring out, producing constant fermentation. Each, .75

Ditto, porous. See Cells, porous.

- 1934.—Cutting Pliers, steel, ordinary “ .75
 1935.—Ditto, ditto, extra strong, for crushing minerals. “ \$1.50
 1936.—Cuvettes, or oblong drainers. “ .75
 1937.—Ditto, Daguerrian, of fine Royal Berlin porcelain, having lip in one corner, about 6 to 9 inches. Each, \$2.00

Cylinders. See Porous Cells.

- 1938.—Ditto, glass, opened at either end.

4 x 6	4 x 7	4 x 9.	“	.40
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- 1939.—Ditto, ditto, 3 $\frac{3}{4}$ x 6, 3 $\frac{3}{4}$ x 8 $\frac{3}{4}$. “ .50

- 1940.—Ditto, plain, on glass foot, flanged tops.

4	6	8	10	12 in.
.35	.40	.50	.55	.60 each.

1941. Ditto, tall, straight side, and ring around the top, for observing color of gases, viz., chlorine, etc., 30 x 3 inches. Each, \$2.00

1942. Ditto, plain, on glass foot, with ring around the top, roughed for glass covers.

5	6	8	10	12	13	15	20 in.
.30	.35	.37	.45	.50	.52	.55	.75 each.

- 1943.—Ditto, ditto, pouring, lipped, on glass foot.

5	6	8	10	12	13	15	20 in. high
.30	.35	.40	.50	.55	.57	.60	.70 each.

1944.—Cylinders, pouring, on wood foot, for specific gravity hydrometers, with flanged tops. Per doz., \$6.00

Ditto, ditto, with glass foot, for mercury. See Mercury Jars.

1945.—Ditto, glass, graduated into cubic inches.

5	12	20	30	50 c. in.
.70	\$1.15	1.65	2.25	3.25 each.



1946



1949



1950



1954

1946.—Ditto, ditto, with lip, graduated into cubic centimetres

5	10	25	50	100	200	250	300	500	1000 centimetres.
.50	.60	.75	\$1.12	1.75	2.25	2.50	2.75	3.00	3.50 each.

1947.—Ditto, ditto, French.

250 c. c. \$2.25

500 c. c. \$3.25 each.

1948.—Ditto, on glass foot, with pouring lip and double graduation.

25	50	100	200	250	500	1000 c. c.
\$1.20	1.40	2.00	2.25	2.50	3.50	4.00 each.

1949.—Ditto, ditto, stoppered, or mixing bottles.

25	50	100	200	500	1000 c. c.
$\frac{1}{2}$	$\frac{1}{2}$	1	1	1	1
\$1.30	2.00	2.25	2.75	3.75	4.50 each.

1950.—Leslie's, 100 c. c. in 10.

Each, \$2.25

1951.—Ditto, graduated, of glass, pouring lip and wooden foot.

250	500	1000 gr.
5	5	
\$1.25	1.50	2.00 each.

1952.—Ditto, French, of exactly even width inside, and carefully graduated, very useful where exact results are demanded.

10	15	25 grammes.
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1953.—Ditto, of glass, with pouring lip.

500	1000 grains.
.75	\$1.00 each.

1954.—Cylinders, for electric machines.

10 to 12	13 to 15	18 in.
\$1.50	2.00	2.50 each.

1955.—Cylinder, 100 fluid grains, graduated to 10 fluid grains stoppered. Each. \$1.50**1956.—Ditto**, 500 grains in $\frac{1}{2}$ grains, stoppered, glass foot. " 2.25**1957.—Ditto**, 500 grs., without stopper, pouring lip, " " 1.50**1958.—Ditto**, 1000 grains, " " " 2.25**Carre's Ice Freezer.** See Ice.**1959.—Day and Night Thermometer**, of glass. 4.00**1960.—Davy's Safety Lamp**, for coal miners, with key. 5.75**1961.—Decanting Jar**, porcelain, with six tubulatures and two knobbed handles, for the washing of powders and their separation into different degrees of fineness, and for decanting liquids.

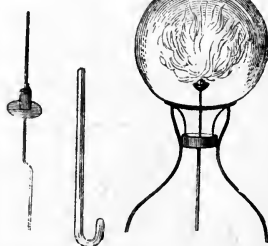
8	16	20	25 lbs.
\$4.00	6.00	7.50	9.00 each.

1962.—Decanting Jars, for Collodion.**1963.—Ditto. Syringes**, glass. Each, .25 to \$1.00**1964.—Ditto. Tubes**, 6in. long, $\frac{1}{8}$ in. bore, both ends smooth, for decanting small quantities of liquid at a time, so not to disturb the sediment. Ea., .05

1961

Decimal Scales. See Centimetre Measures.**Decigallon Measure.** See Metrical Equivalents.**Decoction Strainers.** See Emulsion Mortars.**Decomposition of Water Apparatus.** See Water Decomposition.**1965.—Deflagrating Covers, of Tin.**

Each, .10

1966.—Ditto, ditto, with spoon. " .25**1967.—Ditto**, ditto, and hook. " .20**1968.—Ditto**, ditto, of brass. " .50**1969.—Ditto**, ditto, with spoon. " .75**1970.—Ditto**, hooks. " .05**1971.—Ditto, Globes**, for burning phosphorous and oxygen gas.

1969 1970 1971, 1972, 1973

9	12	15 in.
\$1.25	2.25	3.25 each.

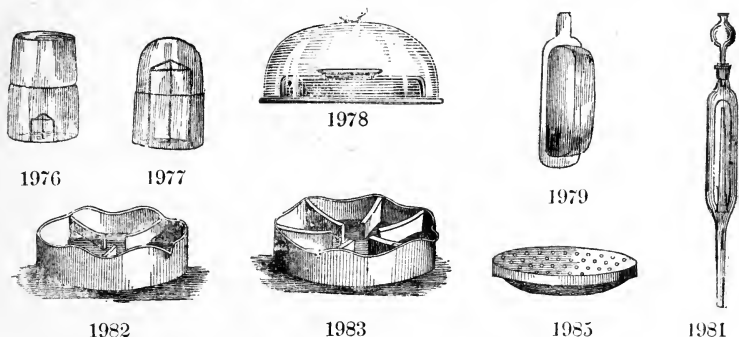
Ditto, Jars. See Bell Jars.**1972.—Ditto. Stands**, or tripods of Iron, to support the deflagrating globe when reversed. Each. \$1.00

1973.—Deflagrating Taper Holder, or socket. .40

1974.—Ditto, Cup, on metallic stand, with heavy iron foot, for holding phosphorous, to burn under an inverted globe containing oxygen gas. \$1.50

Dentists' Furnace. See Furnaces.

1975.—Dessicators, of glass, composed of a small glass jar, roughed on the top, and a flat ground glass cover. Each, \$1.00



1976.—Ditto, composed of two 16-ounce jars, nicely ground and cut glass, with their necks ground together, for drying substances in a confined atmosphere over sulphuric acid; also for cooling crucibles before weighing, flat, polished top. Each, \$2.50

1977.—Ditto, ditto, round top. " 2.00

1978.—Dessicating Apparatus, consisting of bell jar, resting on a flat glass slab, containing a porcelain acid dish and porcelain capsules, or watch glasses

6	8 in.
\$3.00	5.00 each.

Ditto, Baths. See Drying Baths.

1979.—Dessicator, oblong, consisting of glass plate, tray, and oblong bell receiver, ground to fit exactly, to keep substances dry while weighing. \$2.00

1980.—Dessicators, Porter's. Each, 1.50

1981.—Ditto, Schrötter's, to insert into the tubulure of an open mouth bell jar, for cooling substances in dry atmospheric air at ordinary atmospheric pressure. \$1.50

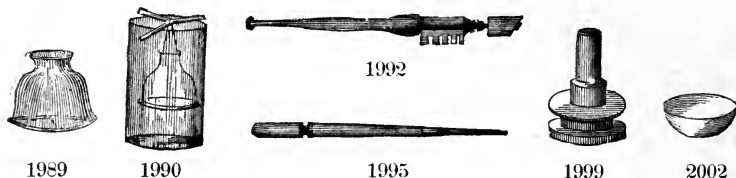
Dessicating Ovens. See Drying Ovens.

1982.—Ditto, Pans, three partitions, 5 inches diameter. Each, 1.25

1983.—Ditto, Pans, six partitions.

$4\frac{1}{2}$	$5\frac{1}{2}$	$6\frac{1}{2}$ in. diam.
\$1.15	1.30	1.50 each.

- 1984.—Dessicating Plates**, porcelain, perforated, 5 to 6 inches. Each, .75
- 1985.—Ditto**, ditto, earthen, perforated, 3 to 5 inches, for drying crystals, etc. Each, .50
- 1986.—Ditto**, ditto, porous, $3\frac{1}{2}$ to $5\frac{1}{2}$ inches. “ 50
- 1987.—Ditto**, **Apparatus**, Fresenius', complete. \$20.00
- 1988.—Ditto**, ditto, Fresenius', for drying at 100 deg. Celsius, consisting of a copper water bath, drying tube, a flask to contain sulphuric acid, etc. \$7.50



- 1989.—Dialyser.** Small, .50 Large, .75
- 1990.—Ditto**, with jar fitted, extra. \$1.25

Diamond Models. See Crown Diamonds.

Ditto, Jar. See Electric Diamond Jar.

- 1991.—Ditto, Sparks**, for burning in oxygen. Prices vary according to the size and quality required.
- 1992.—Diamonds**, for glass cutting, whole set of keys, complete. Each, \$5.00
- 1993.—Ditto**, for writing on glass, with bone handle and silver ferule. Each, \$3.00
- 1994.—Ditto**, ditto, with ivory handle. “ 6.00
- 1995.—Ditto**, ditto, with larger spark, size No. 1. “ 7.50
- 1996.—Ditto**, ditto, with still, larger spark, size No. 2. “ 12.00
- 1997.—Ditto**, ditto, with very long spark, fine ivory handle. Each, \$20.00
- 1998.—Diamond Mortars**, of steel, as used in blow-pipe analysis for crushing minerals, Plattner's usual form. Each, \$5.00
- 1999.—Ditto**, ditto, with brass collar and screw to prevent any escape of the powder when choice specimens are being crushed. Each, \$7.50
- 2000.—Differential Thermometers**, Leslie's, with glass connections between each limb and stopcock in the center. Each, \$4.00
- 2001.—Ditto**, ditto, plain. \$2.50 to 3.50

Decomposition of Water by Galvanism. See Bunsen's Apparatus, under Apparatus.

2002.—Digestors, semi-Berlin, flat bottom, 2 in. diam'r. Each, .12



2002



2005



2006



2012

2003.—Ditto, Meissen. Each, .18

2004.—Ditto, Royal Berlin, with oval bottom, flaring top. Each, .50

2005.—Ditto, Plattner's, flat bottom, flaring top.

2	2¼	4 in.
.25	.30	.50 each.

Ditto. See also Evaporating Kettles.

2006.—Dippers, hammered copper, without seam, round, iron handle, 1 litre capacity.

Each, \$2.00



2007



2008

2007.—Ditto, iron, for pouring metals in assay.

Bowl, 3 in.
.40

5 in. diameter.
.50 each.

2008.—Ditto, tinned, shallow, with long handles, for pouring.

5
.60

5½
.70

6 in.
.80 each.

Ditto, porcelain. See Casseroles.

2009.—Dipping Needle, small, with brass support. \$1.50

2010.—Ditto, ditto, larger. Each, \$2.25 to 5.00

2011.—Dishes, iron, countersunk, tinned, French, conical shape, with handles on either side, used for boiling saccharine matter, 5 in. deep and 10 in. diameter. Each, \$1.50

2012.—Ditto, earthen, deep, round, and flat bottom, for holding acids and acidulous solutions. Imported to order.

10
\$10.00

15
12.00

20 gallons.
15.00 each.

2013.—Ditto, porcelain, round, with lip, for receiving the ashes of the burning filter. Each, \$1.00

2014.—Ditto, ditto, smaller, without lip. " .75

2015.—Dishes, Draining, porcelain, to stand under bottles containing acids or other liquids.

2	2½	2¾	3	3½	4	4½	5 in.
.08	.10	.12	.15	.18	.20	.22	.25 each.

2016.—Ditto. Roasting, of porous clay, sizes, 1½ in. to 10 inches.

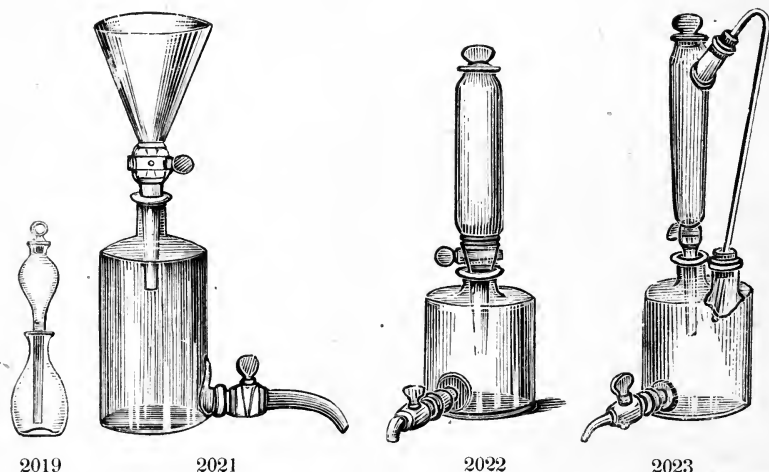
Per doz., .75 to \$5.00 .

2017.—Displacement Apparatus, consisting of a funnel and bottle fitted by means of a cork.

1	2 litres.
.60	.75 each.

2018.—Ditto, ditto, consisting of a separatory funnel fitting into a glass receiver by means of a tightly fitting cork.

pts.	qts.	½ gall.
\$2.50	3.50	4.50 each.



2019.—Ditto, ditto, with ground joint of light blown glass, without stopcock, 6 ounces. .75

2020.—Ditto, ditto, of glass, consisting of separatory funnel, fitting into a glass receiver with ground joint.

pts.	qts.	½ gall.
\$4.00	5.00	6.00 each.

2021.—Ditto, ditto, consisting of a separatory funnel, by a glass ground joint fitted into a separatory bottle, with a ground glass stopcock at foot.

pts.	qts.	½ gall.	1 gall.
\$6.00	7.00	8.00	12.00 each.

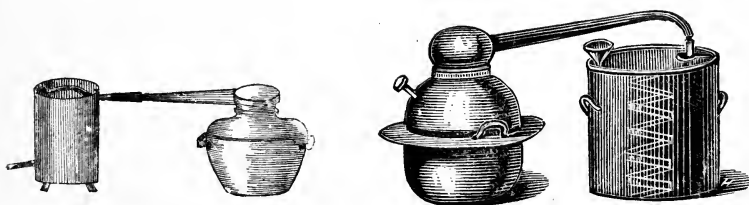
2022.—Displacement Apparatus, Guibourg's, consisting of an oblong glass vessel, stoppered, and with stopcock in the tube, fitted by a ground glass joint into a receiver having ground stopcock at foot; capacity of receiving vessel, $1\frac{1}{2}$ gallons.

Each, \$12.00

2023.—Ditto, ditto, ditto, with a communicating tube between the displacer and the receiver.

Each, \$14.00

The joints of the foregoing apparatus are double ground with the finest emery.



2024

2026

2024.—Distilling Apparatus, for distilling water, spirits, oil, etc., consisting of a polished copper countersunk still, tinned inside, and a worm of block tin enclosed in a tub of zinc, having a receiving and discharging tube.

1	2	3	5 galls.
\$12.00	16.00	20.00	30.00 each.

2025.—Ditto, ditto, nickleized.

1	2	3	5 galls.
\$14.00	19.00	25.00	35.00 each.

2026.—Ditto, with water bath, having a tight fitting water joint and jacket, steam escape, water supply pipe, with thermometer, and extra handles.

1	2	3	5	10 galls.
\$24.00	32.00	40.00	60.00	80.00 each.

Ditto, ditto, Mürrle, for the use of pharmacutists and chemists, complete. See Mürrle's Apparatus, at the close of this volume.

2027.—Distilling Flasks, for fractional distillation.

Per doz., \$1.50

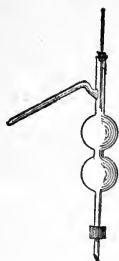
2028.—Ditto, Apparatus, of iron, with safety valve.

pts.	qts.	1 gall.
\$3.75	4.50	6.00 each.

Ditto, Retorts. See Retorts.



2027



2029



2031



2032



2033

2029.—Distilling Apparatus, Wurtz's, for fractional distillation, complete, with thermometer. \$10.00

2030.—Ditto, ditto, glass part only. 2.50

2031.—Döbereiner's Hydro Platinic Lamp, for generating hydrogen, and producing an instantaneous light by throwing a jet of the same upon a piece of spongy platinum; a very convenient lamp for smokers, etc., of German embossed glass.

\$2.50

2032.—Ditto, ditto, of German plain glass. 3.00

2033.—Ditto, ditto, French form, having a small lamp attached which is thrown before the light by the same movement by which the jet is projected; plain. \$7.00



2034



2035



2040



2041



2041A

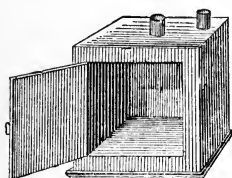
2034.—Ditto, ditto, vase shape. 10.00

2035.—Dome, porcelain, for Bunsen's lamp. 1.00

Douceleur Apparatus. See Apparatus. Drainers. See Crystal Drainers.

2036.—Drawing Tools, in a small box. containing dividers, pencils, etc. \$1.00 to 4.00

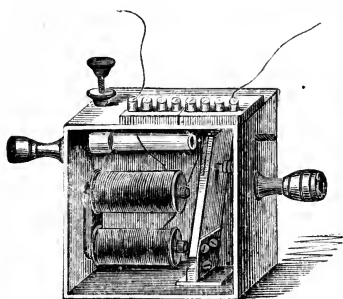
2037. —Drawing Curves. Each, .25
 2038. —Ditto, Protractors, horn. " .75
 2039. —Dropping Glasses, Schuster's, plain. " .20
 2040. —Ditto, ditto, with ground stopper. " .25
 Ditto, Bottles. See Acid Bottles.
 2041. —Ditto, Pipette, with bulb top, covered with rubber film,
 graduated 100 c. c. .75
 2041A. —Ditto, Pipettes. See Pipettes.
 2042. —Ditto, Tube, plain, 4 to 10 inches. Each, .10 to .25
 Drying Apparatus. See Dessicating Apparatus.
 2043. —Drummond Lamp, new French form, for petroleum. \$15.00



2044



2052



2054

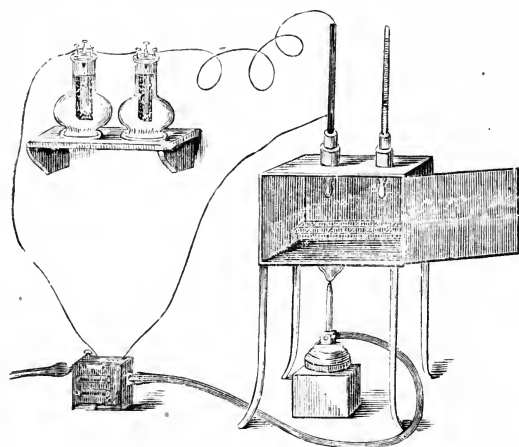
2044. —Drying Baths, copper, 10 inch, with double walls and
 two tubulatures, one for thermometer and the other for escape,
 including thermometer. Each, \$15.00
 2045. —Ditto, ditto, soft, soldered.
 8 10 12 inches.
 \$9.00 13.50 18.00 each.
 2046. —Ditto, ditto, 8 in. with thermometer. " 10.00
 2047. —Ditto, ditto, 10 inch. " 15.00
 2048. —Ditto, 12 inch. " 19.00
 2049. —Ditto, ditto, nickelized. Each size additional. 2.00
 2050. —Ditto, ditto, of tin. Each, 2.50
 2051. —Ditto, ditto, porcelain, for drying filters over hot water.
 Each, \$1.00
 2052. —Drying Bath Regulator, Kemp's, improved. " 3.00
 2053. —Ditto, ditto, with Bunsen's late improvement, consisting of
 an additional spring to steady the pressure of the mercury.
 Each, \$3.50

2054.—Drying Bath Electrical Regulator, for keeping the heat of the water bath constantly at an even temperature.

2055.—Ditto, Bottles, Barker's, small size. Each, \$1.00

2056.—Ditto, ditto, large size. " 1.50

2057.—Ditto, Oven, or hot air bath, having single walls and detached perforated shelf on legs, 8 inches. \$7.00



2058



2059



2060

2058.—Ditto, ditto, with thermometer. \$8.50

2059.—Ditto, ditto, Rammelsberg's conical shape, of copper, hard, soldered, having detached shelf.

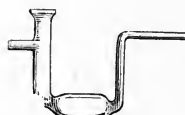
Small size,
\$3.00

larger size,
4.0 each.

2060.—Ditto, Plates, porous clay. Each, .50



2061



2062

2061.—Ditto, Tubes, Liebig's. Each, .50

2062.—Ditto, ditto, Mitscherlich's. " .60

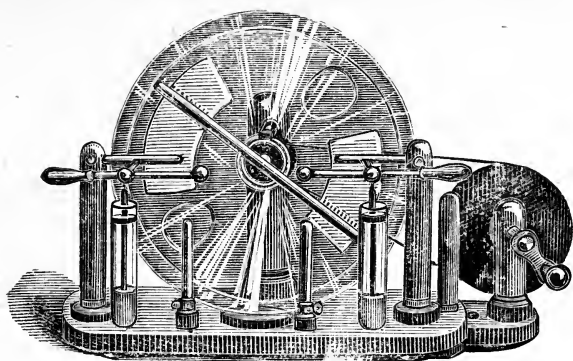
2063.—Druggist Mill, for grinding roots, herbs, etc. \$15.00

2064.—Dutch Metal. Per book, .10

2065.—Dyers' Cloth, for mordanting. Per yard, \$2.00

Dye Pots. See Deep Casseroles.

Earthen Dishes, perforated. See Dishes, Dessicating Apparatus.



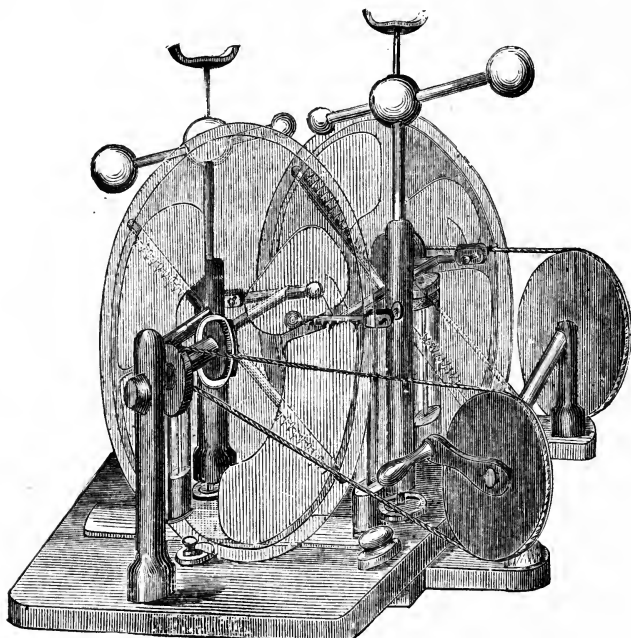
2066

ELECTRICAL AND GALVANIC APPARATUS.

HOLTZ'S *wonderful Induction Electrical Machine as improved by BORCHARD*, and first brought into the United States for sale, by myself, in 1869. It is the most wonderful discovery, in regard to the length of the spark yet known—a spark 6 in. long having been obtained from a 12 in. plate machine, and glass perforated $1\frac{3}{8}$ in. thick. The remarkable machine, imported by myself, now in the possession of Prof. Blake, of Brown's University, has a 30 in. plate, and has produced a spark about 16 in. It ~~was~~ the result of the combined intelligence of Messrs. Holtz, Poggendorf, Rienz, and Dove; was manufactured expressly for me by Mr. Borchard, and is believed to be the best single machine of the kind in the world for practical purposes. It must be borne in mind that the machines I import are *all made for me by the inventor*, and the secret of the long spark has never yet been discovered by the greatest savans in Europe, and I presume that it will not be questioned but that those made by the inventor HIMSELF must inevitably be far superior to any imitations or copies; nevertheless, should my customers desire them, I am prepared to furnish imitations of this celebrated machine as low as any house in America. It should be borne in mind that these machines, with the extra appurtenances, can illuminate large Geissler tubes, pierce thick glass, show rotation by electricity, manufacture Ozone, etc. They are light and portable, and easily excited by the use of a sheet of hardened vulcanized rubber and a cat skin, and when once excited, are well known to retain their electricity from four to five hours. The new and

ingenious collecting and condensing apparatus, invented by C. Van Brunt, Esq., of this country, consisting of a multiplication of the points for the collection of electricity, and a tin foil condenser, as described in the journal of Franklin Institute, may be attached to this machine at my establishment.

2066.	—	Single machines,	Borchard's make,	30 in. plate.	\$225.00
2067.	—	"	"	"	24 in. " 175.00
2068.	—	"	"	"	20 in. " 140.00
2069.	—	"	"	"	18 in. " 100.00
2070.	—	"	"	"	14 in. " 65.00



2071

2071.—Double machines, Borchard's make.

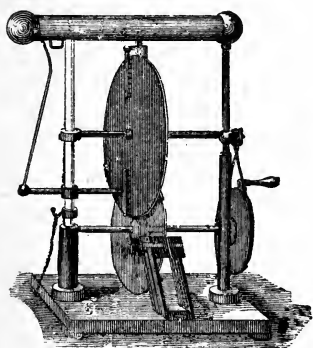
2072.—**Dielectric Machine**, as constructed by M. Carré, having revolving wheels of hardened rubber, the electricity being supplied by friction on stationery rubbers located in front, so that electricity may be generated in every kind of weather. This machine is the most simple and powerful of the static conduction machines; being scarcely affected by atmospheric moisture, it becomes charged in a few seconds, and sustains its action indefinitely. With induction plates from 44 to 60

2054-5444

Electricity.—*Continued.*

centimetres, it gives a constant flow of sparks from 12 to 28 centimetres; it illuminates brilliantly Geisler tubes of over a yard connection; it pierces glass from 8 to 12 millimetres thick; in less than a minute the medium size machine will charge to overflowing a battery of 12 large jars, etc. It also performs the usual experiments of large coils, etc.

The price of a small machine giving from 30 to 40 millimetre sparks, is \$30.00



2072



2080



2087

2073.—Dielectric Machine, No. 1, plates 32 to 44 millimetres.

\$125.00

2074.—Ditto, No. 3, “ 44 to 60 “ 200.00

2075.—Plate Electric Machine, with prime conductor of brass, and supported by pillars of glass, plate 24 in. diameter. \$65.00

2076.—Ditto, 20 inches. 45.00

2077.—Ditto, 16 “ 35.00

2078.—Ditto, 12 “ with japanned prime conductor. 25.00

2079.—Electrophorus. 9.00

2080.—Pith Ball Electrometer. 1.00

2081.—Gold Leaf “ 6.00

2082.—Head of Hair. 1.50

2083.—Leyden Jar, pint. 1.50

2084.—Ditto, ditto, quart. 2.00

2085.—Ditto, ditto, $\frac{1}{2}$ gallon. 2.75

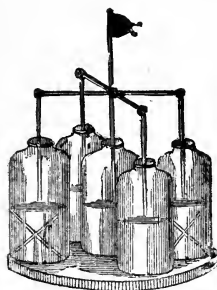
2086.—Ditto, ditto, 1 gallon. 3.25

2087.—Set of Leyden Jars. 6.50

Electricity.—*Continued.***2088.**—Electrical Batteries, in walnut boxes.

4	6	12 qt. jars.
\$11.00	16.00	28.00 each.

(Other sizes in proportion.)



2088



2089



2090



2099



2101

2089.—Diamond Jars, 2 quarts.

Each, \$4.00

2090.—Plain Discharger, glass handle.

2.25

2091.—Jointed Discharger.

5.00

2092.—Universal Discharger.

10.00

2093.—Electrometer Jar, quart.

2.50

2094.—Leyden Jar, with movable coatings.

3.50

2095.—Ditto, ditto, with bells.

6.00

2096.—Electrical Bells, 2 bells.

2.00

2097.—Ditto, ditto, 3 bells.

3.00

2098.—Hiero's Fountain.

18.00

2099.—Electrical Flier.

1.25

2100.—Insulating Stool.

5.00

2101.—Spotted Tube.

\$3.00 to 5.00

2102.—Luminous Plate.

2.00 to 2.50

2103.—Illuminating Egg Stand.

2.00

2104.—Amalgam.

Per box, .40

2105.—Biot's Hemisphere, for showing electricity resides only on the surface.

\$8.00

2106.—Metallic Plates, for dancing figures to suspend.

1.25

2107.—Ditto, ditto, on insulated stand.

6.50

2108.—Ditto, ditto, larger, with double columns.

12.00

2109.—Thunder Houses, mahogany.

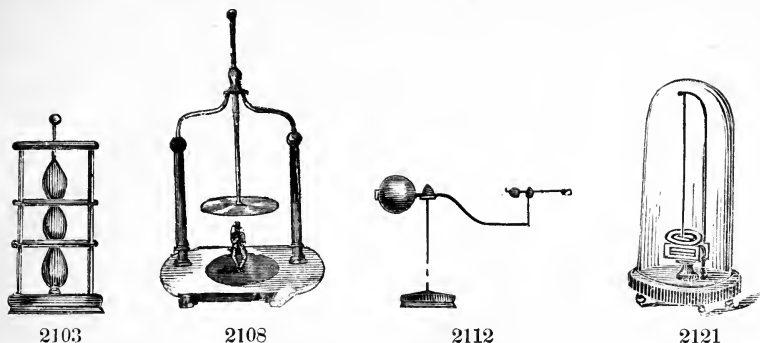
8.00

2110.—Gas Pistol.

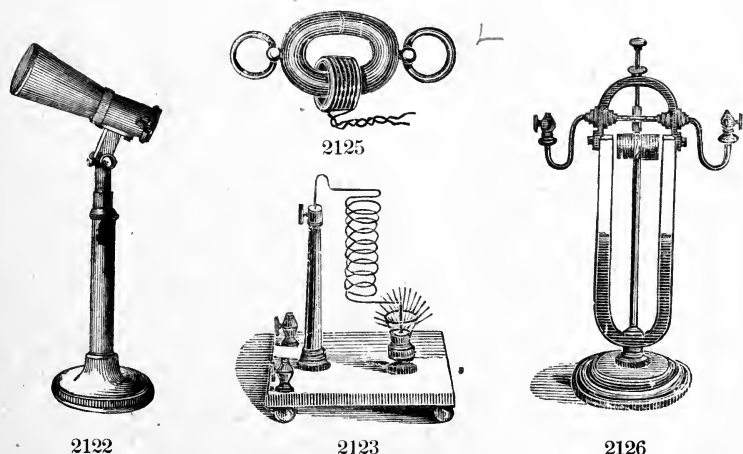
1.25

2111.—Dancing Images, per pair.

1.00

Electricity.—*Continued.*

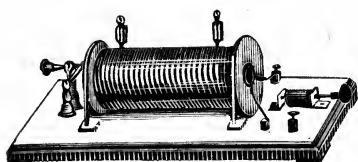
2103.	Electrical Orrery.	\$4.50
2113.	Pith Balls, per dozen,	.25
2114.	Electrical Sportsman, Jar and Bird.	6.00
2115.	Ditto, Pistol.	2.50
2116.	Miser's Plate.	2.50
2117.	Rod of Glass, for illustrating vitreous excitation.	1.00
2118.	Ditto, Shellac, for ditto, ditto.	2.00
2119.	Galvanometer, Astatic.	15.00
2120.	Ditto, Tangent.	10.00
2121.	Ditto, Sensitive.	\$35.00 to 60.00



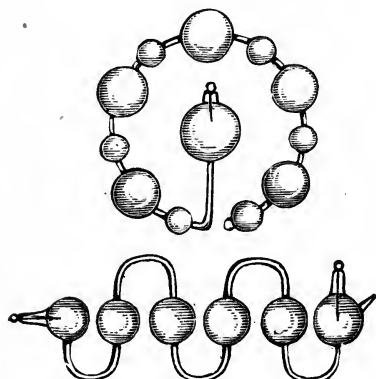
2122.	Thermo Electric Pile.	\$35.00
2123.	Contracting Helix.	5.50
2124.	Helix on Stand, 3 poles.	4.50
2125.	Ditto, with ring armature, or magic circle.	6.00

Electricity.—*Continued.*

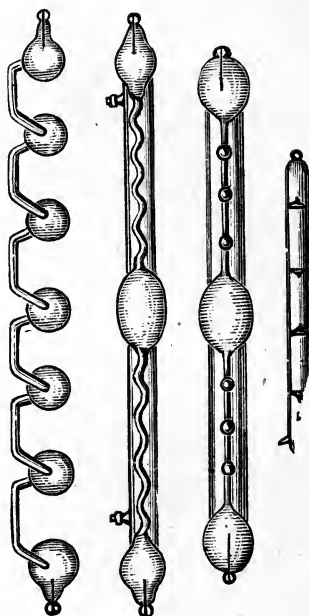
- 2126.**—Page's Revolving Electro Magnet. \$8.00
2127.—Model of Telegraph, with spool and signal key. 8.00
2128.—Telegraph Clock-work. 45.00
2129.—Induction, or Ruhmkorff's Coils, capable of throwing a very small spark. \$7.50



2133



2140

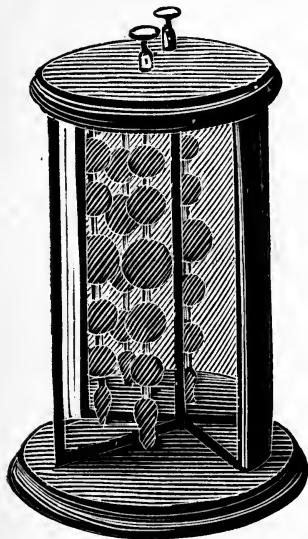


2140

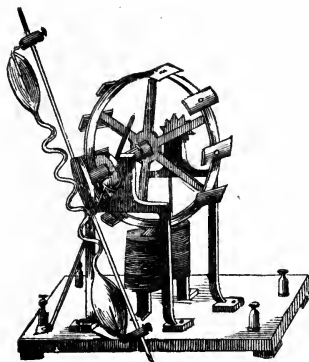
- 2130.**—Ditto, ditto, ditto, $\frac{1}{8}$ in. spark. \$12.00
2131.—Ditto, ditto, ditto, $\frac{1}{4}$ in. " 15.00
2132.—Ditto, ditto, ditto, $\frac{1}{2}$ in. " 30.00
2133.—Ditto, ditto, ditto, 1 in., with contact breaker. 60.00
2134.—Ditto, ditto, ditto, 2 in. " " 100.00
2135.—Ditto, ditto, ditto, 4 in. " " 200.00
2136.—Ditto, ditto, ditto, 6 in. " " 300.00
2137.—Ditto, ditto, ditto, 9 in. " " 460.00
2138.—Ditto, ditto, ditto, 12 in. " " 500.00
2139.—Current Changers. Each, \$3.50 to 10.00
2140.—Geissler's Tubes, plain, each tube marked with the name of the gas it contains. Prices, from \$1.25 to 30.00
2141.—Ditto, ditto, for use with the spectroscope. Each, 3.00

Electricity.—*Continued.*

- 2142.**—Ditto, Vacuum Tubes, in which the vacuum is so perfect that the current will not pass. Each, \$6.00
- 2143.**—Ditto, tubes in form of a rose. \$6.00 to 18.00
- 2144.**—Ditto, ditto, form of a lyre. Each, 7.00
- 2145.**—Ditto, ditto, form of a star. “ 5.00
- 2146.**—Ditto, ditto, form of a U, very brilliant. “ 9.00
- 2147.**—Ditto, ditto, form of a Marguerite. “ 5.50



2150

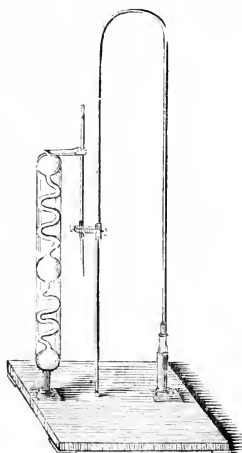


2150A

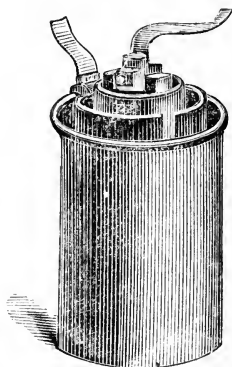
- 2148.**—Geissler's Tubes, form of a cross. \$5.00 to 7.50
Various other forms; single and double spirals, conical and flat spirals, filled and empty. These tubes were selected by myself in my late trip to Europe, and are of the very best make, and brilliant color.
- 2149.**—Geissler's Tube, filled with mercury, showing the effect of phosphorescent light by friction. \$5.00
- 2150.**—Geissler's Tubes, Reflectors, showing small tubes, and multiplying the number by reflection. Each, \$5.00
- 2150A.**—Geissler's Tube Revolving Apparatus, for revolving Geissler's Tubes, by the use of Electricity. The magnets cause the motion to be uniform and regular. Price, \$20.00
- 2151.**—Geissler's Tube Supports, of brass, on mahogany base, with shifting clamps to hold different size tubes. Each, \$10.00

Electric Batteries.

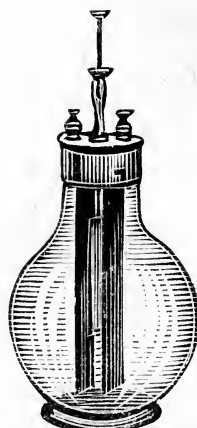
Salts of Mercury for Batteries. See Chemicals.



2151



2152



2162

2152.—Bunsen's large Cells, with rolled zinc plates, $\frac{1}{4}$ in. thick and French sawed carbons, jars 8 in. high. Each, \$5.00

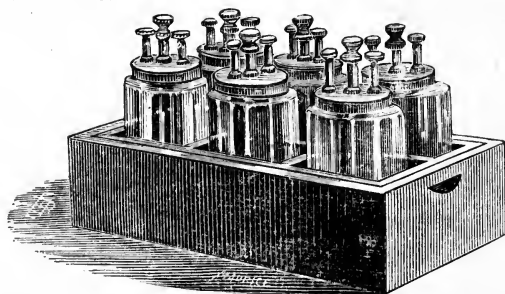
2153.—Ditto, ditto, ditto, jars 6 " " 3.50

2154.—Ditto, ditto, ditto, jars 5 " " 3.00

2155.—Daniel's Batteries. " 2.50

2156.—Grove's ditto. " 2.50

2157.—Smee's ditto. " 2.50

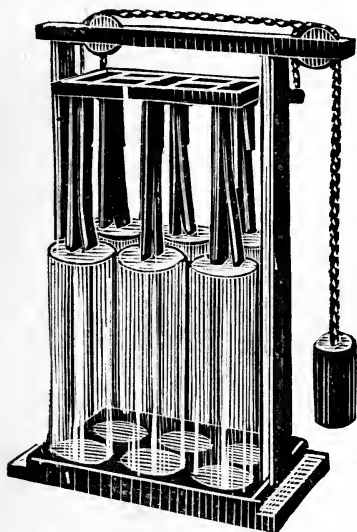


2161

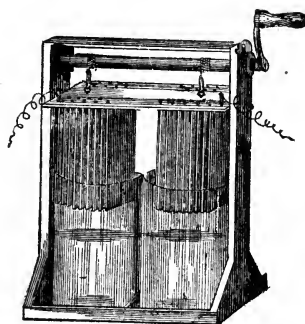
2158.—Leclanche's Constant Battery, consisting of a rod of carbon placed in a porous pot, which is then packed tightly with a mixture of peroxide of manganese and coal, outside of which is a glass jar, in a corner of which is placed a rod of zinc. The exciting liquid is a solution of sal ammoniac. This battery is now the most popular one of its kind in both Germany and France.

Electricity.—*Continued.*

- 2159.**—American Bichromate Battery, improved pattern, quart cells. \$7.00
- 2160.**—Ditto, ditto, pint cells. 5.00



2163



2164

- 2161.**—Six cells of the larger battery, with connections complete, arranged in black walnut box, with partitions and handles, convenient for removing on and off the lecture table. \$40.00

The foregoing arrangement of batteries is the most convenient, cleanly, and available form in use. It is arranged for the employment of one solution, which can be kept readily prepared at hand in a tight, ground stoppered bottle. When the battery is not in use, the zinc may be raised above the solution in the jar (which should be only half-filled with the same); and when the operator desires to renew the contact, the zinc is simply plunged into the fluid by pressing down the sliding rod. The top of the battery being always closed by a tight-fitting brass cap, no offensive fumes can escape to influence chemicals or the atmosphere in the vicinity. The operator will readily perceive that one cell can be employed alone, or any number to the extent of six. The seasonable employment of the sliding rod obviates any danger of shocks in connecting or disconnect-

Electricity.—*Continued.*

ing apparatus with the battery; the power of this battery combined is about equal to that of ten Bunsen's large cells, and the carbon and zincs can be connected or alternated at pleasure.

2162.—French form, ditto, large size, holding about 2 litres.

\$10.00

2163.—Bunsen's Dipping Battery, consisting of 6 cells, zincs and carbons of which are raised and lowered by pulleys.

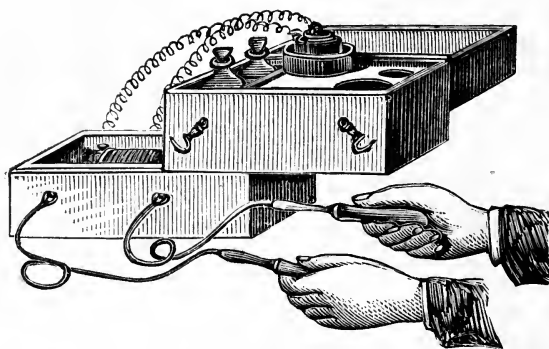
\$40.00

2164.—Ditto, ditto, consisting of two large 3-gallon cells, each cell having five zincs and carbons alternated, the whole raised and lowered by windlass crank.

\$50.00

2165.—Ditto, ditto, three large cells.

65.00



2166

2166.—Ditto, Medico-Electric, for use of Physicians and paralytic persons.

\$12.00

2167.—Electro-Thermal Battery, of bismuth and antimony, oblong shape, with jointed support.

\$30.00

2168.—**Electrical Lamps**, Duboseq's, with clock-work and reflectors, complete.

2169.—Ditto, ditto, Serrin's, French, with clock-work, complete, large size.

\$450.00

2170.—Ditto, Browning's, with automatic regulator, and movement to adjust the height of the carbon-poles while burning, very useful in showing spectra in screen experiments.

\$30.00

2171.—Ditto, regulated by hand, with reflector.

15.00

2172.—Ditto, enclosed in a dark chamber, with reflector.

\$20.00

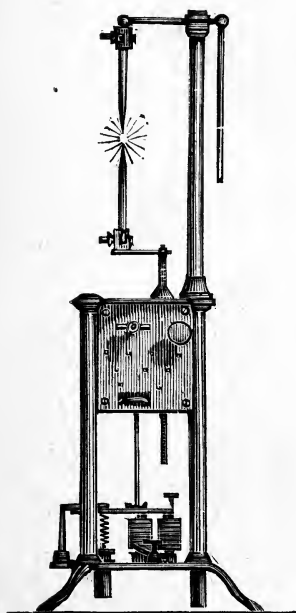
2173.—**Electrical Apparatus**, with clock-work, for changing the current from one battery to another, without disconnecting.

\$50.00

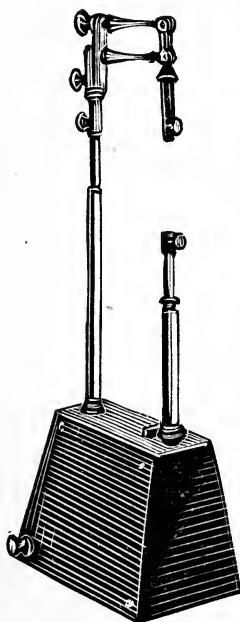
Electricity.—*Continued.*

2174.—Electrometer, Thompson's, with scale and screen, as improved by Kirchoff. \$75.00

This new and unique form of Electrometer is deserving of attention, on account of its extreme delicacy and facility of indication of very small amounts of electricity, which can also be quantitatively measured. Prof. Kirchoff has added a valuable and interesting photometric attachment, rendering it a very easily read, and most complete instrument. It is certainly a great step in advance in the quantitative estimation of electricity, and is receiving great attention from the Physicists of the old world. (See illustration on next page.)



2168



2169

2175.—Elutriating Apparatus, Schultze's, for the mechanical analysis of soils, clays, ground ores, etc. Each, \$5.00

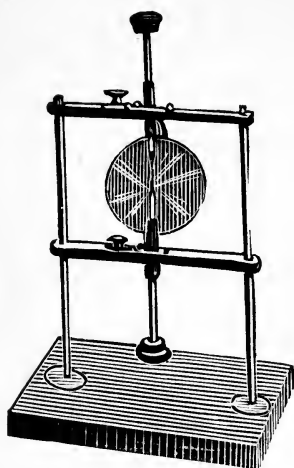
2176.—Ditto, Noebel's Apparatus, for washing soils in analysis.

Each, \$4.50

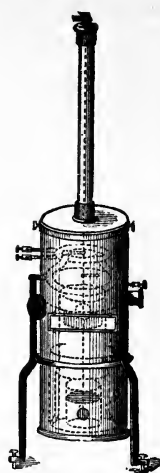
2177.—Ditto, ditto, with support.

" 5.50

2178.—Ditto. See Decanting Jars.



2171



2174



2175

2179.—Enamels, French, for enameling jewelry. For gold enamel, white. Per oz. \$1.00

2180.—Ditto, ditto, black. “ 1.25

2181.—Ditto, for enameling gold—transparent blue, green, cerulean blue, lapis lazuli, opaque green, and transparent yellow.

Per oz. \$1.50



2176

2182.—Ditto, ditto, turquoise.

Per oz. \$3.00

2183.—Ditto, ditto, transparent red.

“ 7.50

2184.—Ditto, ditto, for enameling copper; deep red, blue, lapis lazuli, turquoise, dark green, transparent violet. Per oz. .25

2185.—Ditto, ditto, for ditto; black, transparent green, clear yellow, deep yellow. Per oz. .50

2186.—Enamellers' Files, of hardened steel, for cutting round glass tubes. Each, \$1.50

2187.—Ditto, Knife, cocoa handle. .50

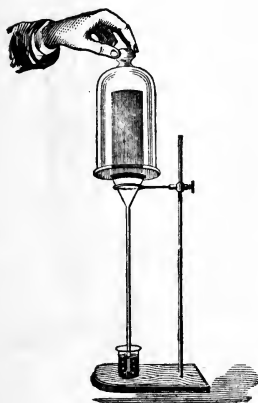
2188.—Ditto, Plates, of refractory clay.

$\frac{4\frac{3}{8}}{.15}$

$\frac{4\frac{3}{4}}{.18}$

$\frac{5\frac{1}{8}}{.20}$

$5\frac{1}{2}$ in.
.25 each.



2189



2190



2191



2194

2189.—Endosmosis, apparatus for diffusion of gases, without stand and bell-glass. \$1.50

2190.—Eolipile, or Ether Jet, glass apparatus, for showing combustibility of the vapor of ether. .50

2191.—Ditto, Lamp, or Spirit Blast blow-pipe of brass, with vertical jet. Each, \$2.00

2192.—Ditto ditto, of tin. " 1.00

Eprouvettes. See Test Glasses, and Specimen Tubes.

Erdmann's Float. See Burette Swimmers.

2193.—Ether Distilling Apparatus, consisting of a glass retort, receiver, alcohol reservoir, etc., capacity of retort,

1 qt.
\$3.85

2 qts.
5.50

1 gall.
7.15

2 galls.
10.00 each.

Ether Bottles. See Bottles.

2194.—Ditto, Extraction Apparatus, Bohemian, capacity of receiver $\frac{2}{3}$ gallons. Each, \$14.00

2195.—Ditto ditto. See also Displacement Apparatus.

2196.—Eudiometer, Bunsen's, 500 millimeters in $\frac{1}{2}$. \$3.50



2196



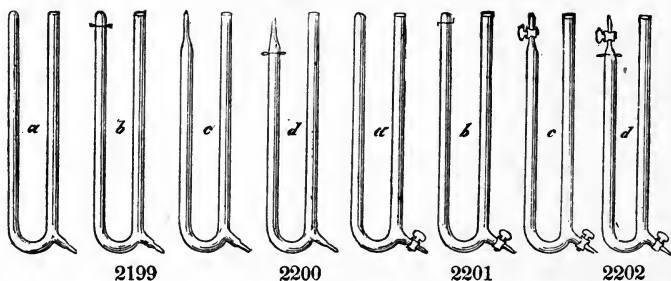
2197



2204



2198



2199

2200

2201

2202

- 2197.**—Eudiometer, Hoffman's, V shape, mounted. \$7.00
2198.—Ditto, **Large Lecture**, Hoffman's, mounted on stand. 15.00
2199.—Ditto, Hoffman's, with two parallel limbs, one sealed and one open. \$2.00
2200.—Ditto, ditto, with parallel limbs, one sealed, and one drawn at the top. \$2.50
2201.—Ditto, ditto, with two parallel limbs and one stopcock at the bottom. \$3.50
2202.—Ditto, ditto, with two parallel limbs and one stopcock at the top, and one at bottom. \$4.00
2203.—Ditto, Ure's, straight, 200 c. c. in $\frac{1}{2}$. 2.00
2204.—Ditto, ditto, U form, 60 c. c. in $\frac{1}{2}$. 3.50

Evaporating Dishes, of glass, straight sides and flat bottoms. See Crystallizing Dishes.

2205.—Ditto, Bohemian glass, round bottom, nests of 4. \$1.25



2206



2208



2210



2213



2216

2206.—Ditto, ditto, ditto, lipped, in nests of 6. 1.50

2207.—Ditto, ditto, of iron, glazed inside and out, with lip, deep and hemispherical.

5

6

7 in.

\$1.25

1.35

1.75 each.

2208.—Ditto, of platinum.

2

2½

3 in.

According to quantity, per gramme,

.35 to .40.

2209.—Ditto, silver.

2

2½

3 in.

Per oz., \$4.50

2210.—Ditto, of Royal Berlin porcelain, with spout glazed inside and out, except the bottom.

Nos.	00	0	1	2	3	4	5	6	7
Diam.	1½ oz.	2	3	4	6	8	10	14	24
	.18	.22	.28	.35	.40	.45	.62	.75	.95

8 9 10 11

45 oz. 2 qts. 3½ 6

\$1.30 2.00 3.00 3.85 each.

2211.—Ditto, ditto, nests of 7, from 00 to 5. \$2.25

2212.—Ditto, ditto, nests of 6 to 11. 11.00

2213.—Ditto, ditto, Royal Berlin, without lip, 3 inches diameter.

Each, .20

2214.—Ditto, of glazed, Royal Saxon, without lip.

2 in.

3 in.

.15

.35 each.

2215.—Ditto, ditto, with lip glazed, inside and out.

Nos.	5	4	3	2	1	0	00	000
	\$1.10	1.40	1.75	2.00	2.75	4.00	6.00	10.00 each.

2216.—Ditto, ditto, Royal Berlin, porcelain, shallow form and flat bottom, stout, glazed throughout, except the bottom, with spout.

Nos.	1	2	3	4	5	6	7
	1	1½	3	4½	7	10	16 oz.
	.22	.30	.35	.42	.50	.66	.83 each.

2217.—Ditto, full nests of the above. \$2.75

2218.—Evaporating Dishes, French, hemispherical, glazed throughout, except the bottom, of very thin white porcelain.

40	55	70	84	97	110 m.m.
.25	.30	.40	.50	.60	.75 each.

2219.—Full sets of the above. \$2.50

2220.—Ditto, thin semi-porcelain, watch-glass form, with spout, glazed inside.

Nos. 1	2	3	4	5	6
.15	.18	.20	.25	.30	.40 each.

2221.—Full nests of above. \$1.00

2222.—Ditto, ditto, deep hemispherical.

Nos. 1	2	3	4	5	6	7	8	9
1½	2	3	4	6	8	10	14	16 oz.
.15	.20	.25	.30	.35	.45	.50	.55	.70 each.

2223.—Sets of 6 of the above. \$1.25

2224.—Ditto, 9 “ 2.75



2218



2225



2226



2227

2225.—Ditto, ditto, watch-glass form, stouter, glazed inside. An excellent dish for quick evaporation.

Nos. 6	7	8	9	10	11	12	13	14	15	16
Cap'y										
.45	.55	.65	.75	.85	\$1.00	1.30	1.75	2.10	3.50	5.00 ea.

2226.—Ditto, ditto, Thuringian semi-porcelain, lipped, and heavy rim around the top.

Nos. 8	9	10	11	12	13	15	16	18
24 oz.	1 qt.	1½	2	3	1 gall.	2	3	5
.75	.85	\$1.00	1.20	1.75	2.10	3.50	5.00	9.00 each.

2227.—Ditto, semi-porcelain, flat bottom, round lip, and glazed inside and out, except the bottom.

Nos. 4	3	1
\$1.00	1.25	2.00 each.



2228.—Ditto, with rim around the top, sharp lip.

11	11½	12½ in.
\$1.50	1.75	2.25 each.

2228

Ditto, ditto. See also Capsules.

2229.—Ditto, or gold washing pans, 30 inch diameter, of Russian iron, countersunk. Each, \$1.00

2230.—Ditto, ditto, or trays of lead, small. “ .50

2231.—Evaporating Kettles.

2
\$3.50

5 gallons.
8.50 each.

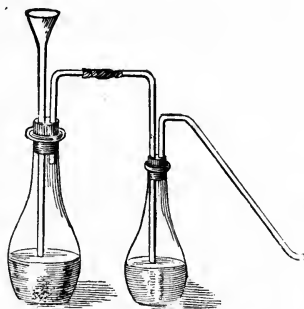
Exsiccators. See Dessicators.



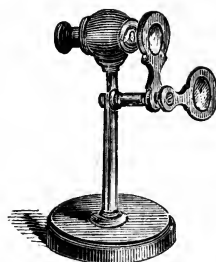
2231



2240



2233



2234

2232.—Eye Baths, of glass. Each, .25

2233.—Evolution Flask, funnel and delivery tube (without delivery flask). \$1.25

2234.—Eye Models, for showing the reflection on the eye lenses, with the use of spectacles. Each, \$15.00

Faraday's Retorts. See Retorts.

2235.—Files, enamellers', for cutting glass. Each, 1.00

2236.—Ditto, round, half round and flat.

4	5	6	7 in.
.20	.25	.35	.40 each.

2237.—Ditto, triangular.

3	4	5	6	8 in.
.18	.25	.30	.40	.50 each.

2238.—File Handles. Each, .10

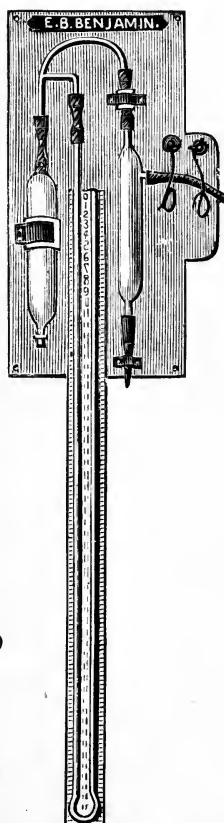
2239.—Filtering Apparatus, porcelain. \$8.00

2240.—Ditto, ditto, Plantamour's, tin bath for hot water. \$2.50

2241.—Ditto, ditto, of copper, with porous strainer \$1.25

2242.—Ditto, ditto, Beale's quick 75

2243.—Ditto, ditto, for rapid filtration, by Prof. Bunsen's method, under atmospheric pressure. \$11.00



2243

The foregoing apparatus has come into extensive use both in Europe and in this country: filters precipitates, etc., which, with the old method, would take, in many familiar instances, four to ten hours to filter properly, in a tenth of the time taken by the old method. Alluminous, Sillicious, and ordinary sulphide of hydrogen precipitations, are quickly filtered from. So convenient and useful has it become, and so generally recognized by the profession, that it is considered almost an indispensable requisite of every laboratory. The illustration shows the arrangement of this pump; full description of the method of employment of this apparatus, and several of its excellencies may be found in Johnson's latest edition of Fresenius's Quantitative Chemical Analysis, from which I extract the following observations, and I have recently introduced an improvement in the working of this apparatus, by which the filtrate may be received directly into a beaker, for the suggestion of which I am indebted to Dr. Gibbs, of Harvard College.

"This apparatus is screwed down on a board fastened to the wall, in such a manner that each separate piece of the apparatus is held by a single fastening only, in order to prevent the tubes from being strained or broken by the possible warping of the board. On opening the first pinchcock, the water flows down the discharge to a depth of thirty feet, carrying with it the air which it sucks through the upper tube. The second pinchcock is used to regulate the flow of the steam, when the first one is completely open. The discharge pipe should have a fall of about thirty feet, and be of a diameter of half-an-inch, and end in a sewer or some other arrangement, to convey the water away. The filtration is made in the following manner. The receiver standing in a metallic vessel is connected by a small glass or rubber tube, with the discharging tube on left of the illustration (having previously been fitted with filter). At first, the delivery is gradual, but in a moment or two the filtrate runs through in a continuous stream, often so rapidly that one must hasten to keep up the supply of liquid.

"The Platinum Cone is placed in the bottom of the glass funnel, the dry paper filter then introduced in the ordinary manner, moistened, and freed from all adhering air bubbles by pressure with the finger. A filter so arranged, and in perfect contact with the glass when filled with a liquid, will support the pressure of an entire atmosphere without the least danger of breaking, and the interspace between the folds of the platinum foil is perfectly sufficient to allow of the passage of a continuous stream of water."

2244.—Filtering Apparatus, Bell Glasses, with tubulature at foot, for above. See Bell Glasses.

For other appurtenances of Bunsen's quick filtering apparatus, see their appropriate heads in this Catalogue.

2245.—Filter, calico, a very strong and durable filter, conical, with folds. \$2.50

2246.—Filter Dryer, of porcelain. \$1.00

2247.—Filter Holders, japanned. Each, 3.00

2248.—Filter Hooks, of glass, to hang between the funnel and filter. Per doz. .50 to .75

2249.—Filtering Rings, of unannealed wire. “ .60

2250.—Ditto, ditto, porcelain, to attach to an upright stand, single arm. Each, .50

2251.—Ditto, ditto, ditto, with three arms, to place over a glass vessel when filtering into it. Each, .35

2252.—Filtering Flasks, extra stout, to bear pressure. “ .50

Filter Covers. See Covers.

Filter Stands. See Funnel Supports.

2253.—Filters, felt, conical shape, for filtering wines, etc.

Nos. 8	12	16
\$1.00	2.00	3.00



2248



2251



2253

2254.—Ditto, French, cut in a circular form, packs of 100 each, grey, *genuine* Prat-Dumas.

Nos. 25	33	40	45	50
7½	10	13	15	17½ in.
.40	.55	.75	\$1.00	1.25 per pack.
Per 12 sheets,	Nos. 80	100		
	26	38 in.		
	.75	\$1.00		

2255.—Ditto, ditto, white, in packs of 100.

2	3	4	5	6	7½	15	16½ in.
.15	.20	.25	.35	.45	.55	\$1.25	1.50 per pack.

2256.—Filtering Paper, white, French, 15x18. Per ream, \$4.50

2257.—Ditto, ditto, Berzelius's, similar to Swedish, but firmer.

Per quire, .75

2258.—Ditto, ditto, Chardin, exceedingly stout and heavy, for making filtering pulp. Per sheet, .20, per ream, \$30.00

2259.—Ditto, ditto, best German laid paper, extra heavy, 19x22.

Per quire, 65, per ream, \$9.00

PER QUIRE, PER REAM.

- 2260.—**Filtering Paper**, letter A, laid, 19x22, .60, \$7.00
 2261.—Ditto, ditto, “ B, wove, 18x21, .50, 6.50
 2262.—Ditto, ditto, “ C, laid, 15½x18½, .40, 4.50
 2263.—Ditto, ditto, “ D, wove, 16x19, .40, 4.55
 2264.—Ditto, ditto, “ E, wove, 15x19½, .35, 4.00
 2265.—Ditto, ditto, Swedish, genuine, having the water-mark J. C. Munktell, as recommended by Prof. Fresenius.

Per quire, \$1.50

- 2266.—**Finger Tips**, of rubber, to put on the fingers when handling acids, iodine, etc. Each, .10

- 2267.—**Fire Syringe**, producing instantaneous light by sudden condensation of air, of brass, 7 in. cylinder. \$3.00

- 2268.—Ditto, ditto, of glass, with brass cap and piston. \$8.00

- 2269.—**Fire Clay**.

Per lb. .05

- 2270.—**Fittings**, for evolution bottles.

Each, .30

- 2271.—Ditto, for wash bottles.

“ .10 2273

- 2272.—Ditto, for Woolf's bottles.

“ .15

Flameless Lamp. See Aphlogistic Lamp.

- 2273.—**Flasks**, assay, or parting, long-necked, of hard Bohemian glass. Per doz., \$1.50

- 2274.—Ditto, assay, conical, flat bottom, with projecting ring around them about two-thirds of the way from the base to the top, to prevent the tongs from slipping when they are being lifted, thoroughly annealed, of best Bohemian glass. Each, .50

- 2275.—Ditto, ditto, best Bohemian glass, with lip, without ring.

Each, .50

- 2276.—**Flasks**, very best and genuine Bohemian, with vial mouth and flat bottom.

1	2	4	6	8	12	16	24	32 oz.
\$1.20	1.30	1.60	2.25	2.50	3.00	3.25	3.75	5.50 per doz.

½	1	2	3 gall.
.75	\$1.25	1.75	2.00 each.

- 2277.—Ditto, ditto, flat bottom, vial mouth, pear shape, for dentists, etc.; 2 gallons. Each, \$2.50





2278



2279



2280



2281



2290

2278.—Flasks, round bottom, vial mouth, pear shape.

8	16	32 oz.	$\frac{1}{2}$ gall.
\$3.00	4.00	6.00	10.50 per doz.

2279.—Ditto, ordinary flat bottom, with a ring around the neck to bear corking.

1 to 2 oz.	4	8	16	32	$\frac{1}{2}$ gall.	2
.12	.15	.20	.25	.35	.75	\$2.00 each.
\$1.20	1.50	2.00	2.50	3.50	7.50	20.00 per doz.

2280.—Ditto, best Bohemian glass, flat bottom, pear shape, with ring around the neck.

4	8	16	32 oz.
\$2.50	3.25	4.25	6.50 per doz.

2281.—Ditto, round bottom, pear shape, with ring around the neck to bear corking. Prices the same as the foregoing.

2282.—Ditto, Rose's blow-pipe or "Reagirkelchen," of very small size, pear shape, with flaring mouth, for use with the blow-pipe.
Per doz. .60

2283.—Ditto, small, blown before the lamp, of best hard German glass, globular shape, light and thin glass, with flat bottoms, suitable for specific gravity.

$\frac{1}{4}$	$\frac{1}{2}$	1 oz.
.60	.75	\$1.00 per doz.

2284.—Ditto, best German "Florence," vial mouth.

2	4	8	16	24	32 oz.
\$1.25	1.60	2.25	2.75	3.25	3.75 per doz.

2285.—Ditto, of best Bohemian, with a tubulature half-way up the neck.

16 oz.	qts.
7.5	\$1.00 each.

2286.—Ditto, ditto, ditto, with tubulature on either side of the bulb.

$\frac{1}{2}$	1 gall.
\$1.50	2.25 each.

2287 —Ditto, Bologna.

Per doz., \$1.50

2288.—Flasks, copper. 1 qt., \$3.00; 2 qts., \$4.50 each.

2289.—Ditto, iron.

Each, \$1.00

2290.—Ditto, gas, of best Bohemian glass, bottle shape, with ring around the neck.

8	16	32	48 oz.
.35	.40	.50	.60 each.

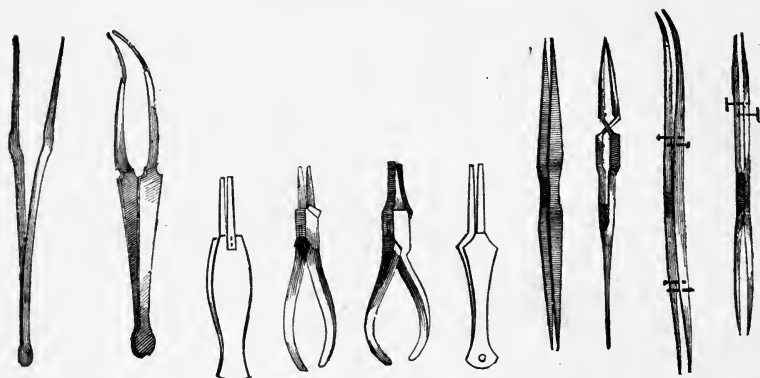
Ditto, litre. See Litre Flasks, or Bottles.

Ditto, oxygen. See Oxygen Retorts.

Float, Erdmann's. See Burette Swimmer.

Florentine Receivers. See Receivers.

Forks, for gas burners. See Gas Burners.



1291 2293 2292 2294 2296 2298 2299 2301A 2300 2302

2291.—Forceps, brass, ordinary, plain.

Each, .50

2292.—Ditto, ditto, stout.

“ .75

2293.—Ditto, ditto, ends bent in parallel directions, with ivory tips.

Each, .75

2294.—Ditto, jewelers, polished steel, square taper jaws.

“ .75

2295.—Ditto, ditto, heavier.

\$1.00

2296.—Ditto, ditto, unpolished, Stubb's, extra strong, for holding and crushing the button and minerals, in assay.

Each, \$1.25

2297.—Ditto, of polished steel, 7 inches long, and lined with cork.

Each, \$1.00

2298.—Ditto, steel, ordinary, small.

“ .25

2299.—Ditto, ditto, form No. 1.

“ .50

2300.—Ditto, ditto, form No. 2.

“ .50

2301.—Ditto, ditto, form No. 3, German silver point.

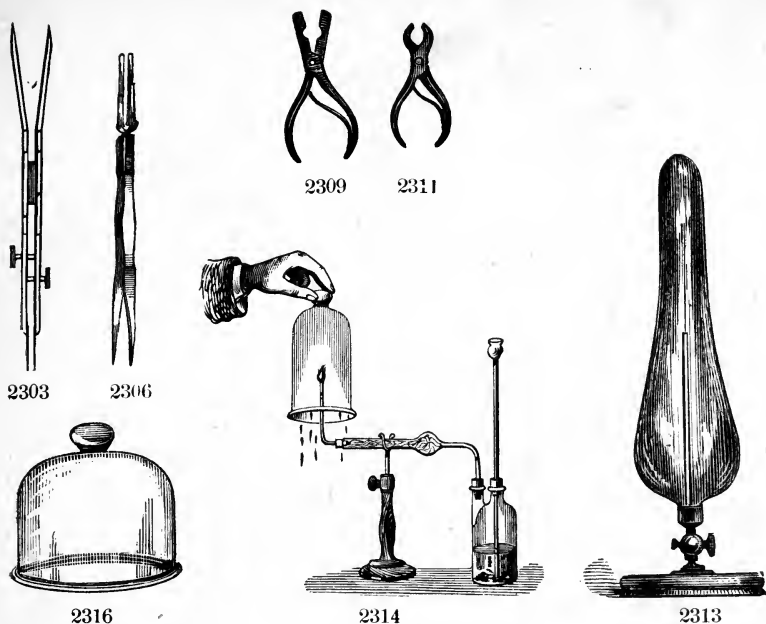
“ .75

2301.A—Ditto, steel, form No. 4, hardened rubber end.

“ .75

2302.—Ditto, ditto, form No. 5, German silver point.

“ 1.00



2303.—Forceps, steel, platinum point, ordinary German form.

Each, \$1.50

2304.—Ditto, ditto, ditto, German silver.

" 1.75

2305.—Ditto, German silver, French shape, platinum ends.

" 2.00

2306.—Ditto, steel, with extra heavy platinum points.

" 2.50

2307.—Ditto, heavy brass, platinum ends.

" 1.00

2308.—Ditto, wire, platinum points.

" .75

2309.—Ditto, for breaking glass, heavy, of steel.

" .75

2310.—Ditto, for bending wire, round ends, Stubb's.

" 1.25

2311.—Ditto, for cutting wire.

" .75

2312.—Ditto, brass, with spring.

" .75

Fossils. See Minerals and Fossils.

✓ **2313.—Fountain in vacuo.**

9.00

2314.—Formation of Water, apparatus for, produced by the combustion of hydrogen under a bell jar.

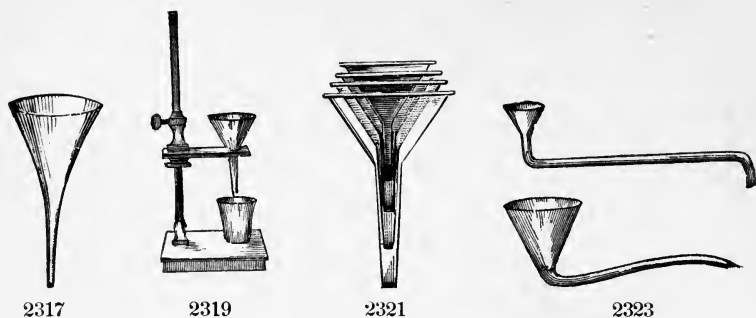
\$2.50

Fractional Distillation. See Distillation, Michro-Chemical Retorts, Flasks, etc.

2315.—Frames, for the charts and photographs mentioned in this catalogue, according to the styles required.

2316.—Freezing in vacuo, Leslie's apparatus.

\$3.00 to 6.00

**2317.—Funnels, American glass.**

2 oz.	4	8	16	32	$\frac{1}{2}$ gall.	1 gall.
.10	.15	.18	.25	.35	.50	.75 each.

2318.—Funnels, best Bohemian glass, formed to an angle of 60° all the edges ground evenly.

$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6 in.
.15	.18	.20	.22	.28	.30	.36	.44	.60 each.

2319.—Ditto, ditto, formed especially after a pattern, with bottom of a cone formed to a true angle of 60°, and having a stem with parallel sides, made expressly for Bunsen's quick filtering apparatus.

2	$2\frac{1}{2}$	3	4	5 in.
.20	.25	.30	.40	.50 each.

2320.—Ditto, ditto, fluted or ribbed, best imported ground tops.

2	3	4	5 in.
.20	.30	.40	.50 each.

2321.—Ditto, German glass, small, in nests of 3, largest 1 inch across the top. Per nest, .25**2322.—Ditto, ditto, angle 60°, tops unground.**

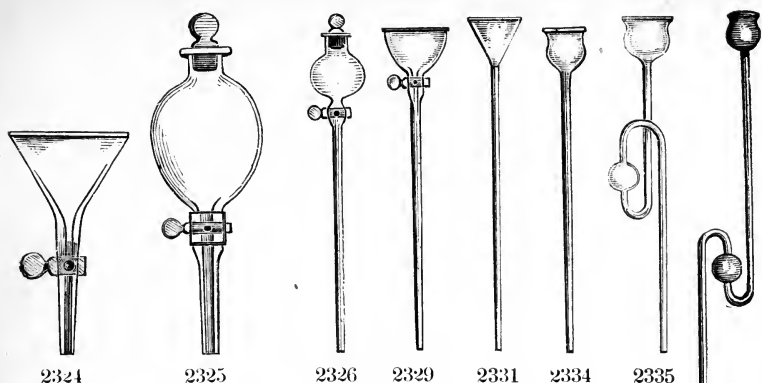
2	3	4	5	6 in.
.12	.15	.20	.25	.30 each.
\$1.00	1.20	2.00	2.50	3.50 per doz.

2323.—Ditto, glass, long, bent stem, for filling retorts.

2	4	1	18	24 oz.
.35	.40	.50	.65	.80 each.

2324.—Ditto, separatory, of best Bohemian glass, conical, formed to an angle of 60°, with stopcock ground into the neck.

4	6	8 in.
\$2.50	3.25	4.50 each.



2325.—Funnels, separatory, globe shape, stoppered.

1 qt.

\$3.50

2 qts.

4.50 each.

2326.—Ditto, ditto, globe shape, stoppered, small, with funnel tube for separation and use in volumetric analysis.

Each, \$1.25

2327.—Ditto, ditto, ditto, hemispherical, of light blown glass.

Each, \$1.00

2328.—Ditto, ditto, conical, formed on an angle of 60°, stout Bohemian glass.

Each, \$1.50

2329.—Ditto, tubes, glass, with stopcock between the cone and the tube.

Each, \$1.00

2330.—Ditto, ditto, glass, with plug stopper ground into the neck of the funnel.

Each, \$1.00

2331.—Ditto, ditto, ordinary, conical, stout glass, length of stem,

18

20

24 in.

.15

.20

.25 each.

2332.—Ditto, ditto, conical, of light blown glass.

12

16

18 in.

.25

.30

.35 each.

2333.—Ditto, ditto, thistle top.

12

18 in.

.18.

.25 each.

2334.—Ditto, ditto, thistle top, bulb double the size of the above, tube 18 in. long.

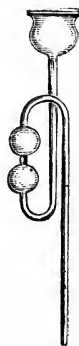
Each, .30

2335.—Ditto, ditto, Welter's safety thistle top, one bulb.

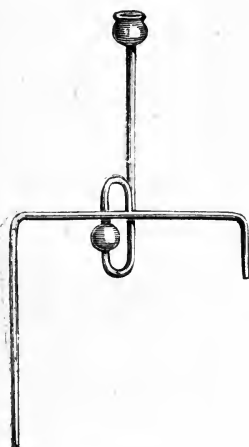
Each, .30

2336.—Ditto, ditto, ditto, 2 bulbs, 30 inches.

Each, .40



- 2337.**—Funnels, tubes. Welter's. 3 bulbs. Each, .50
2338.—Ditto, ditto, ditto, conical top, 1 bulb. " .40
2339.—Ditto, ditto, ditto. " 2 " " .50
2340.—Ditto, ditto, ditto. " 3 " " .60
2341.—Ditto, ditto, ditto, short stem, thistle top, 2 and 3 bulbs.
 Each, .50



2342



2343



2344



2346

- 2342.**—Ditto, ditto, Mitscherlich's form, of 2 limbs and safety bulb, and thistle top funnel in the center. Each, .50
2343.—Ditto, ditto, glass, Filling. " .50
2344.—Ditto, porcelain, safety, with bulb at the base of the cone. Each, 75
2345.—Ditto, ditto, conical, with loop handle at the side.

3	4	4½	5½	6 in.
.40	.55	.70	.90	\$1.00 each.

2346.—Ditto, ditto, filtering, with staves inside.

3	3¾	4½	5½	6 in.
.60	.70	\$1.00	1.40	1.70 each.

2347.—Ditto, ditto, percolating. Each, \$3.50
2348.—Ditto, ditto, perforated, without stem.

3	3½	4	4½	5¼	6 in.
.40	.50	.60	.70	\$1.25	1.50 each.

2349.—Ditto, ditto, ditto, with large holes to support cloth filters.

3½	4½	5	5½	6½	7½ in.
.50	.55	.80	\$1.00	1.50	1.75 each.

2350.—Ditto, ditto, German, with handle. Each, .25

2351.—Funnels, gutta percha, conical.

3 $\frac{1}{8}$	4 $\frac{1}{4}$	4 $\frac{3}{4}$	5 $\frac{1}{2}$	7	7 $\frac{7}{8}$ in.
.60	.75	\$1.00	1.50	1.75	2.00 each.

2352.—Ditto, ditto, spherical, $\frac{1}{2}$ gallon.

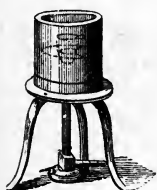
Each, \$5.00

Ditto, for hot filtration. See Filters.

Funnel Supports. See Supports.

FURNACES.

2353.—Furnace gas, Erdmann's, of fire clay, with tripod stand, without burner. .75



2353



2355



2357

2354.—Ditto, porcelain, to surround Bunsen's burner 1.00

2355.—Ditto, sheet iron, having 7 concentric rings on the top, mounted on three legs. \$4.50

2356.—Ditto, with large Rose's burner. 10.00

The above apparatus is found very useful by apothecaries and in small laboratories for evaporations, hot mixtures, etc.

Furnaces, for gas, small. See Stoves.

Ditto, for kerosene. See Stoves.

2357.—Ditto, French, hand, clay. Each, \$2.50 to 10.00

2358.—Ditto, Kent's, portable, sheet iron, small size, 17 in. high, of strong plate iron, lined with fire clay; it has six doors, the dome being hinged, that it may be more easily placed off or on; the openings are conveniently arranged for the reception of porcelain tubes; has a sand bath, water bath, a set of concentric rings, to receive a vessel as small as 3 $\frac{1}{2}$ inches in diameter.

Each, \$25.00

2359.—Ditto, Chamott.

" 3.00

2360.—Ditto, cupelling, French, of refractory clay, bound with iron bands; it is composed of three parts. without the dome,

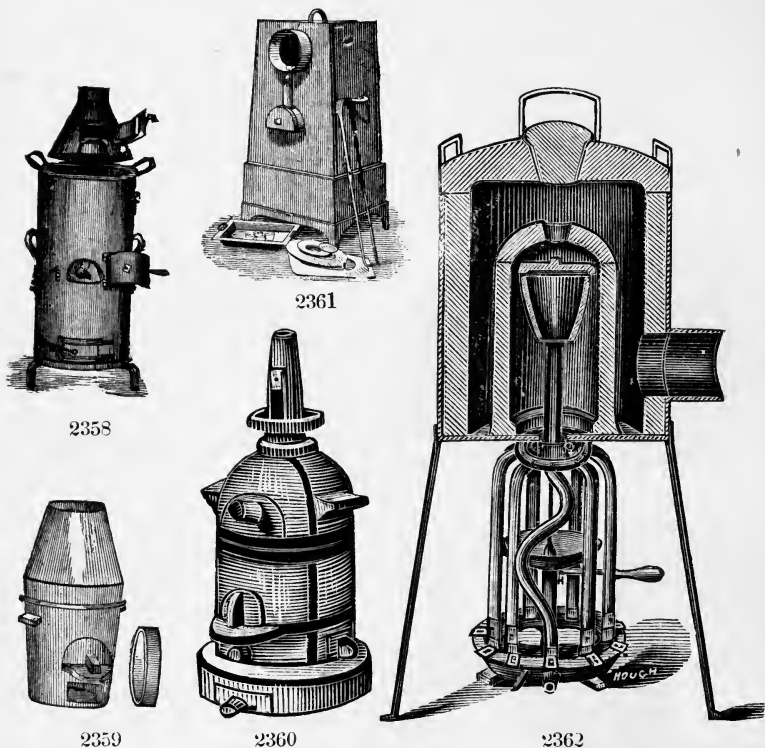
with scorifying, cupel and tube openings, and stop doors for the same, complete.

Nos. 1
\$15.00

2
20.00

3
25.00

4
35.00 each.

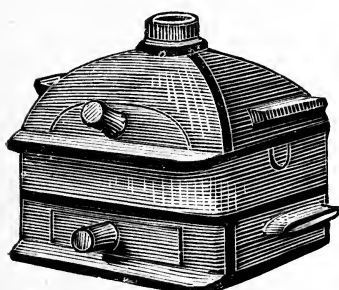


2361.—Ditto, Hibb's patent, of heavy cast-iron, lined with fire clay, with arrangements for the cupel muffle to extend through the center of the furnace, so the fire may extend all around it; has separate opening for tubes and retorts; it is supplied with water bath, sand bath, concentric rings, etc. A very highly esteemed and convenient furnace, as it may be used both for assay and heating purposes, and the muffle may be withdrawn at any time for examination. \$50.00

2362.—Ditto, Perrot's gas blast of sheet iron, with a thick lining of fire clay, as per sectional illustration. The blast is received underneath, and gas supplied to nine large Bunsen's burners, having the jets thrown to a common center; the supply of

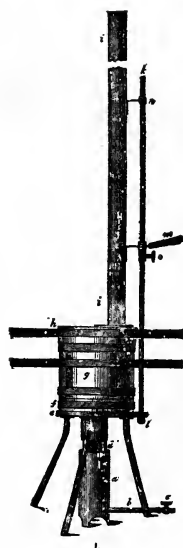
gas is regulated by a hand crank. When in operation, the concentrated flame is forced up through an opening at the bottom of the furnace, and completely surrounds the crucible resting on a pestle of fire clay, enclosed in an inner wall of the same material, which soon becomes superheated to such an extent that five pounds of gold may be melted in the short space of eight minutes. This valuable furnace is also used by enamelers, jewelers, dentists, etc.

Nos. 1
\$40.00

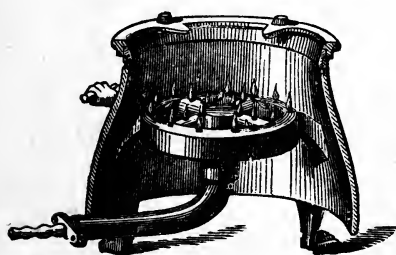


2360

2
60.00 each.



2365



2364

2363.—Ditto, No. 0, melting 500 grammes of copper at one time.

\$35.00

2364.—Ditto, a new French crown, for gas, composed of a large number of jets on a circular support, and surrounded by an iron frame, which reflects the heat, and at the same time supports the vessel to be heated. It is very highly esteemed by all the manufacturers that have used it.

Nos. 1
\$8.00

2
10.00

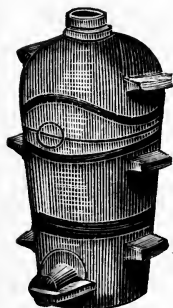
3
12.50 each.

2365.—Ditto, gas, Griffin's, for chemical operations at a white heat; it is 2 feet high and 8 in. wide, consisting of a brass

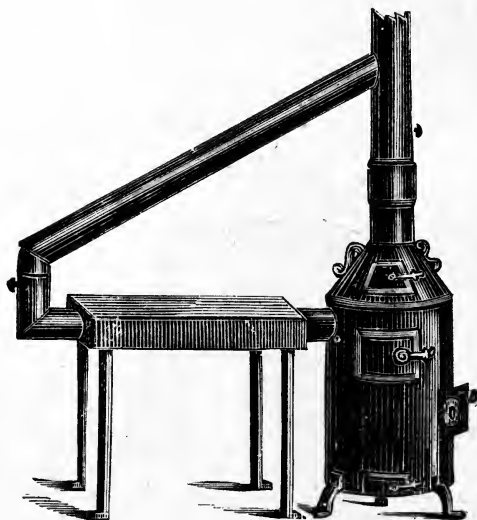
cylinder open at the bottom, at the top of which are 16 Bunsen's burners fixed, having a gas supply pipe regulated by stopcock. It rests on an iron stool, to which the chimney is attached by means of braces. The furnace itself is a cylinder of fire clay resting on a fire clay sole plate, which is pierced to receive the fire from the burner; it measures 6 inches in height, 8 inches outside diameter, and 5 inch bore. The crucible to be heated is supported on a perforated plumbago cylinder, and reaches within about an inch of the face of the gas burner. The dome, or roof of the furnace is carefully constructed so as to have a good draft; the consumption of gas when at work is 33 cubic feet an hour. \$20.60



2366



2367



2368

2366.—Furnace and Lead Basin, for etching, with hydrofluoric acid on glass. \$12.00

2367.—Ditto, enamellers, of French refractory clay, with large opening, for the use of enamellers, dentists, etc., in two parts, grates and stops for openings.

Nos. 1

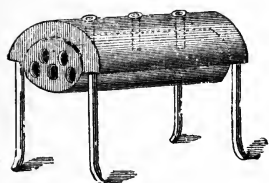
\$20.00

2

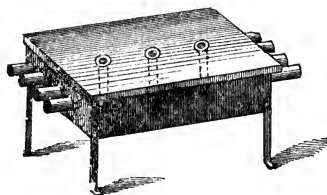
25.00 each.

2368.—Ditto, Chilton's universal, of heavy sheet iron, lined with fire brick, having moveable grate and ash box; it is so arranged

that the pipe above the furnace slides up and down so as to permit the top to be removed, and the deep iron sand bath accompanying the furnace, to be put in the place of it. A set of cast iron rings accompanies the furnace, and the doors are suitably stopped. It is a very convenient furnace for all the purposes of a laboratory, such as melting, distilling, evaporating, cupelling, etc. \$40.00

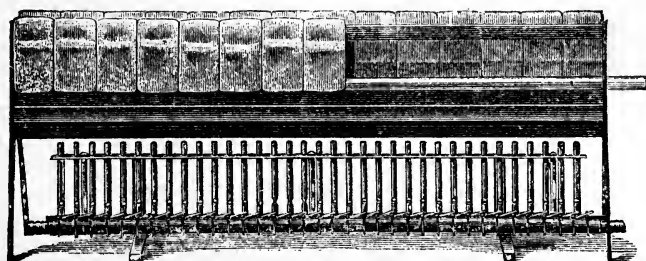


2369



2372

- 2369.**—Ditto, or oven, Carius's, for heating substances, in sealed glass tubes. \$12.00
2370.—Ditto, ditto, with Kemp's gas regulator, two thermometers and Bunsen's burner. \$22.00
2371.—Ditto, Erlenmeyer, for two tubes. 7.50
2372.—Ditto, ditto, for four tubes. 9.00
2373.—Ditto, two thermometers. 1 gas burner, 1 gas regulator, extra. \$10.00
2374.—Glass Tubes for ditto, heavy, strong, hard glass. 1.00



2375

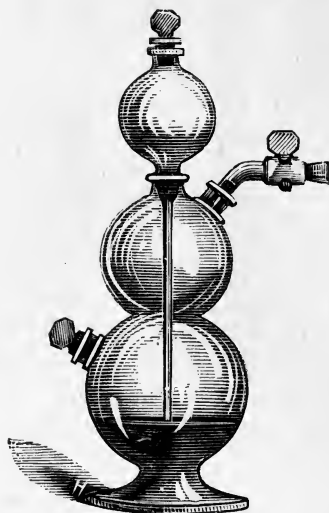
- 2375.**—**Furnace Combustion**, Bunsen's, improved, 25 burners, with stems, to turn on or off gas instantaneously. \$60.00
 Ditto, ditto. See also Combustion Furnaces.
2376.—**Galactometer**, consisting of a wooden standard, graduated with a tube attached to the same to receive the milk: \$3.00

Gas Furnaces. See Furnaces.

- 2396.**—**Gas Generator**, Kipp's, for sulphuretted hydrogen, ordinary form, with safety tube in top. \$6.00



2396

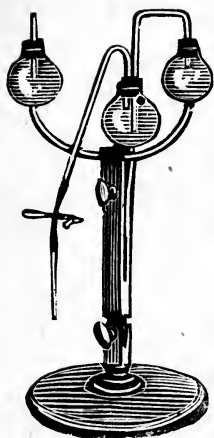


2397

- 2397.**—Ditto, ditto, Bohemian, with double concentric and inner stoppers. \$7.50
- 2398.**—Ditto, ditto, small, with safety funnel in top. 3.50
- 2399.**—Ditto, ditto, for hydrogen, of copper, brazed, to hold 15 gallons. Price, including bell and fittings, \$35.00
- This is a first class apparatus, and will give an abundant supply for a large laboratory.

- 2400.**—Ditto, ditto, sulphuretted hydrogen, Babo's, consisting of two bulbs, with open mouth, united by a semi-circular tube, for the prompt supply of gas in small quantities. Price, mounted, \$2.50.

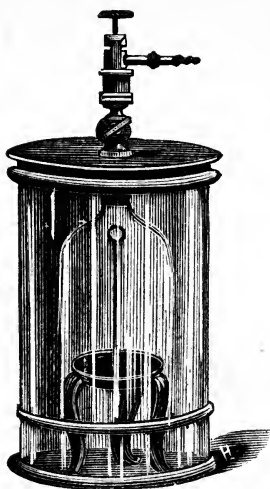
The bulb, on the right of the illustration, is half filled with lumps of sulphide of iron; the other bulb is partly filled with diluted sulphuric acid; the apparatus being placed on the support, revolves on the center, and can be fixed by the thumb-screw in any required position; when the bulb containing the sulphide of iron is raised above the other bulb, the acid is thrown back into the right bulb, and its action on the sulphide of iron ceases; otherwise, when this bulb is placed below, the sulphuric acid flows upon the sulphide of iron, and a continuous current of sulphuretted hydrogen gas passes off by the bent, glass tube, into the washing flask, and thence outward. When the apparatus is not in use, it is simply necessary to elevate the bulb containing the sulphide of iron and close the pinchcock on the flexible tube.



2400



2402



2403

2401.—Price of the glass part of the above apparatus, without wash bottle. Per doz., \$12.00

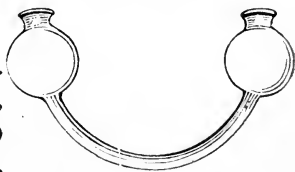
2402.—Gas Generators, hydrogen, of glass. Each, 5.00

2403.—Ditto, ditto, of extra heavy, French crystal glass jar. containing bell shape gas holder, leaden tripod, stopcock, and gallow-screw connector.

Height, 9 10½ 13½ 16 19 in.
\$10.00 12.00 15.00 20.00 25.00 each.

2404.—Ditto, for sulphuretted hydrogen, by the employment of asbestos. \$1.00

2405.—Ditto, ditto, for Oxygen, of copper, double bottom, and iron top, carefully secured. 1 qt., \$4.50 ½ gall., 6.00 each.



2401

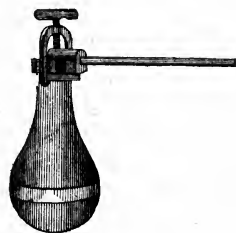
Gas Globes. See Deflagrating Globes.

2406.—Gas Holders, Pepys', made of japanned zinc, and having a glass tube on the side to indicate the quantity of gas in the gas holder.

10 galls. 15 galls.
\$20.00 25.00 each.

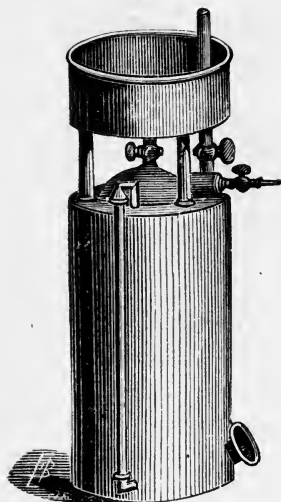
2407.—Ditto, ditto, of copper.

10 galls. 15 galls.
\$27.50 37.50 each.

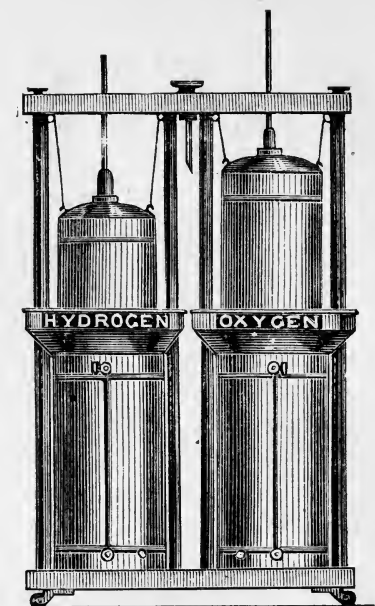


2405

2408.—Ditto, ditto, for oxygen and hydrogen, containing 15 gallons of very heavy japanned zinc, with bells, complete. \$70.00



2406



2409

- 2409.—Gas Holders**, for oxygen and hydrogen, 23 gallons, new arrangement for holding the bells always in perpendicular position, mounted on castors, and having weights enclosed in a frame. \$100.00

Gas Jars. See Bell Jars, Bell Glasses, etc.

- 2410.—Gasometer**, Bunsen's mercurial, graduated to millimeters. \$2.75

- 2411.—Gas Meter**, large, with exposed indices, covered with glass, stopcock, pressure indicator, regulator, and delivery jet. \$50.00

- 2412.—Gas Regulation Burner.** \$5.00

- 2413.—Gas Regulator**, Kemp's, improved by Bunsen. \$3.00

- 2424.—Gas Pistols**, japanned tin. .50

- 2415.—Gas Pipettes**, Ettling's, of glass. 2.00

Other Gas Apparatus. See Gas Analysis.

- 2416.—Gas Tubes**, plain, small, 6 inches in length.

Per doz., \$2.00

- 2417.—Ditto**, Bunsen's.

25 in $\frac{1}{2}$
\$1.25

50 in $\frac{1}{2}$
1.75

100 in $\frac{1}{2}$
2.00

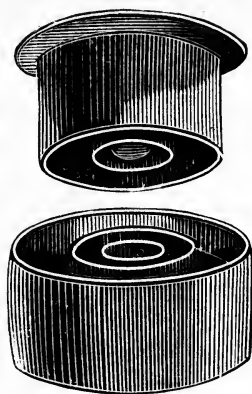
200 in 1
2.50 each.



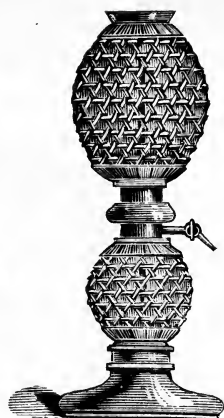
2413



2410



2419



2420

2418.—Gas Tubes, Bunsen's, 5 cubic inches in 10. Each, \$1.75

2419.—Gas Washing Apparatus, consisting of two porcelain dishes, fitting the one into the other, with concentric shoulders. \$5.00

2420.—Gasogenes, French, cane covered, for two bottles.

Each, \$7.50

2421.—Gauge Tubes, for steam boilers.

Per lb. 1.00

2422.—Gauze, of brass wire netting, 5, 10, 20, 40, 60, 80, and 100 meshes.

Per square foot, .60 to .90

2423.—Ditto, of copper.

" .85

2424.—Ditto, of iron.

" .30 to .40

Geissler Tubes. See Electric Tubes.

2425.—Glass Blowers' Table, with sheet iron top, drawers, double bellows, and brass discharge pipe. \$40.00

2426.—Ditto, ditto, of wood, with double bellows.

15.00

2427.—Glass Plates, colored, for examination of colored flames, assorted.

3x3	3x4	4x4 in.
.10	.15	.20 each.

2428.—Ditto, of fine French mirror glass, $\frac{1}{4}$ inch thick.

3	4	6	8	9	10	12 in.
.25	.35	.60	\$1.00	1.25	1.50	2.25 each.

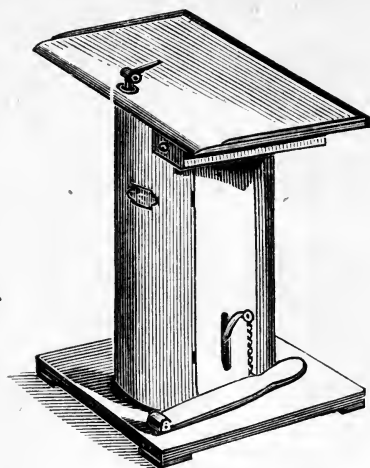
2429.—Ditto, ditto, ground on both sides, 1 inch thick.

6	7	8	12 in.
\$2.00	2.25	2.75	8.50 each.

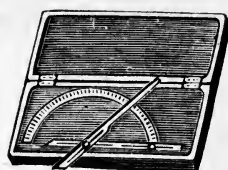
See also Covers, glass.

2430.—Glass Ends, for burettes, drawn.

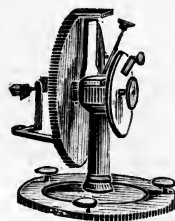
Each, .05



2325



2436



2437

- 2431.**—Glass Pieces, small broken pieces. Per lb., .25
2432.—Glass Rods, assorted sizes and qualities. .60 to .75
 Glass Tubing. See Tubing.
2433.—Glass Shades, furnished to order.
2434.—Ditto, feet, to ditto. Each, .40 to \$4.00
2435.—Gloves, india rubber, of best manufacture, without seam.
 for handling acids and acidulous preparations. Per pair, \$5.00
 See also Finger 'Tips'.
2436.—Goniometers, Hauys', for measuring the angles of crystals, in morocco case. Each, \$10.00
2437.—Ditto, Wollaston's, reflecting. " 30.00
2438.—Ditto, German, reflecting, with eye lenses to read the graduations. A very fine and accurate instrument. Each, \$50.00
2439.—Graduate Glasses, for test purposes, not engraved, with glass foot.

$\frac{1}{2}$	1	2	4	8	16	32 oz.
.12	.15	.20	.25	.40	.50	.75 each.

- 2440.**—Graduates, registered minims, German, vase form.

60	120 minims.
.50	.75 each.

- 2441.**—Ditto, English form, glass foot.

60	120 minims.
.50	.75 each.



2440

2441

2442.—Graduates, registered, English shape.

1.	2	4	8	16	32 oz.
.25	.30	.45	.60	\$1.00	1.50 each.



2443



2445



2446



2447



2448



2449



2450

2443.—Ditto, ditto, tumbler shape.

$\frac{1}{3}$	1	2	4	6	8	16	32 oz.
.35	.40	.50	.65	.70	.80	\$1.50	2.00 each.

2444.—Ditto, ditto, French, carefully and accurately graduated.

8	12	16	32 oz.
\$1.00	1.25	1.75	2.25 each.

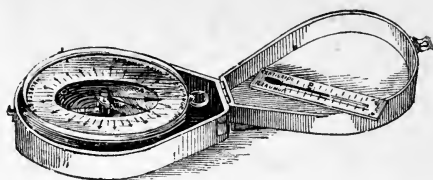
2445.—Ditto, porcelain. 8 16 oz.
\$1.00 1.50 each.**Grain and Gramme Weights.** See Weights.**2446.—Hammers, blow-pipe, Plattner's, usual form, square head,**
Nos. 2 and 3. Each, .75**2447.—Ditto, ditto, Freiberg style, octagonal, Nos. 1 and 4. “ \$1.00****2448.—Ditto, mineralogical, pointed at both heads, for trimming,**
No. 5. Each, \$1.00**2449.—Ditto, ditto, one end pointed and the other flattened, No. 6.**
Each, \$1.25**2450.—Ditto, for watchmakers, small and round head. “ 1.00****2451.—Ditto, geological, one head flattened and the other pointed,**
for breaking ores. Each, \$1.75**2452.—Ditto, ditto, extra large and heavy, for field work. “ 2.00****2453.—Ditto, ditto, and polished, for use with two hands (small**
sledge). Each, \$2.50**2454.—Handles, of wood, for files, hammers, etc. “ .06 to .50****2555.—Hand-bladder Glasses. Each, .75 to \$1.00****Hardness of Minerals, tests for.** See Minerals.



2452



2456



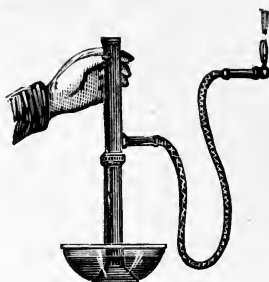
2458



2455



2457



2459

Hessian Crucibles. See Crucibles.

Heat Apparatus. See collection at the latter part of this book.

Hoffmann's Ditto, collection of. See the list of the same at the back of this book.

2456.—Holders, for caustic, ivory, with silver ends. Each, \$4.00

2457.—Ditto, for platinum spoons and wire. " .60

Ditto, for burettes, supports, test tubes, etc. See Supports, Test Tubes, etc.

2458.—Holsterique Barometer, with thermometer, accurately adjusted, fine polished brass mounting, in velvet-lined morocco case. Each, \$35.00

Hot Water Funnel. See Funnels.

2459.—Hydroclese, or metallic syringe, French, in velvet-lined, mahogany cases. For males, \$4.00

The chief merit of this clyso-pump is, that a piston is dispensed with, the liquid drawn acting in this capacity. Its construction is based on the simplest laws of Hydraulics, and is purely metallic. It can be employed advantageously for all kinds of injections, and, by increasing its volume, acts as a medicinal *douche*.

2460.—Ditto, ditto, ditto. For females, \$5.00

Hydrogen Generator and Pistols. See Gas.

Hydraulics and Hydrostatics. See collection at the close of this book.

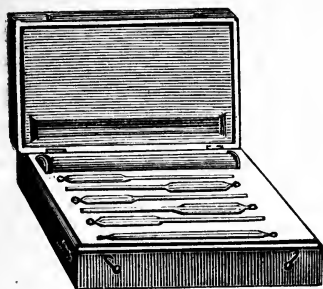
HYDROMETRY.

- 2461.—Hydrometers**, for Acids and acetuous fermentations, Balling's. Each, \$1.25
- 2462.—Ditto**, Otto's, 0 to 12, in fourths. " 1.25
- 2463.—Ditto**, for Acids, Beaume's, 0 to 70, in fourths, in pasteboard cases. Each, .75
- 2464.—Ditto**, ditto, ditto, for liquids heavier than water, Beaume's scale, graduated about 70.
- | | | |
|------|---------------|---------------|
| in 1 | $\frac{1}{2}$ | $\frac{1}{4}$ |
| .75 | .80 | .85 each. |
- 2465.—Ditto**, for Alkali, or fluids lighter than water, Beaume's scale. Each, .75
- 2466.—Ditto**, for ditto, in pasteboard cases, in 1. " .75
- 2467.—Ditto**, ditto, ditto, in tin cases, No. 204. " .60
- 2468.—Ditto**, ditto, ditto. " .50
- 2469.—Ditto**, for Acid, in chamois-lined leather cases, with thermometer and glass jar complete.
- | | | |
|---------|------|------------|
| No. 995 | 996 | 997 |
| \$4.00 | 4.50 | 5.00 each. |
- Ditto, for alcohol. See Alcoholometers.
- 2470.—Ditto**, Manual containing tables for alcoholometers, Pyle's. Each, .50
- 2471.—Ditto**, empty cases for Hydrometers. " 50
- 2472.—Ditto**, for Bark, in pasteboard cases. " 1.00
- 2473.—Ditto**, Beer and Wort, Balling's, in pasteboard cases. " 1.00
- 2474.—Ditto**, ditto, with thermometer, in " " 2.00
- 2475.—Ditto**, for Brine, pasteboard cases. " 1.00
- 2476.—Ditto**, for Coal oil, 30 to 50. " .75
- 2477.—Ditto**, up to 80. " 1.00
- 2478.—Ditto**, Densimeter. " 1.00
- 2479.—Ditto**, Ether, Beaume's scale. " .75
- 2480.—Ditto**, ditto, pese, French, No. 2585. " 1.00
- 2481.—Ditto**, for Fluids heavier than water, 0 to 70. Each, .75
- 2482.—Ditto**, ditto ditto, with thermometer and specific gravity scale, 1000 to 2000. Each, \$2.00
- 2483.—Ditto**, for Fluids lighter than water, 10 to 40. 75
- 2484.—Ditto**, ditto, ditto, with thermometer and specific gravity scale, 700 to 1000. Each, \$1.50

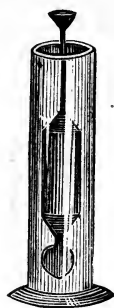
- 2485.—Hydrometers**, for petroleum, etc. Each, \$2.00
2486.—Ditto, for Milk, ordinary style. “ .50
2487.—Ditto, ditto, 0 to 25. “ .75
2488.—Ditto, Milk Essayers, Chevalier, jar and therm'r, “ 1.50
2489.—Ditto, ditto, Quevenne, with jar and thermom'r, “ 1.00
2490.—Ditto, for Most and Wine, French, in tin cases. “ 1.50
2491.—Ditto, ditto, Oechsle's. “ 1.50
2492.—Ditto, for rich Oils, French, Lefebvre, with thermometer in
pasteboard cases. Each, \$2.00
2493.—Ditto, ditto, ditto, 22 to 50. “ 2.00
2494.—Ditto, for Salt. “ .75
2495.—Ditto, **Saccharometers**, French, for testing syrup, in
pasteboard cases. Each, .75
2496.—Ditto, ditto, Beaume's, for Syrups and Sugar. “ .75
2497.—Ditto, ditto, Balling's, for “ “ “ \$1.00
2498.—Ditto, ditto, with thermometer enclosed. “ 2.00
2499.—Ditto, ditto, thermometer and Specific gravity scale extra.
Each, \$2.50
2500.—Ditto, ditto, for testing Sugar and Syrups, according to Dr.
Scheibler. In chamois-lined morocco case, with three spindles,
and cylinder. Each, \$15.00
2501.—Ditto, ditto, for Shellac, one spindle, in pasteboard cases. 1.00
2502.—Ditto, ditto, *Universal*, for **Specific Gravity**, one spindle
registering 700 to 2000, for fluids heavier or lighter than water,
in pasteboard box. Each, \$2.00
2503.—Ditto, ditto, two spindles, 700 to 1000 and 1000 to 2000, in
pasteboard boxes. Per set, \$3.00
2504.—Ditto, ditto, single spindles, in pasteboard boxes.

700 to 850	1000 to 1200	1400 to 1600	
700 to 1000	1000 to 1400	1400 to 2000	
750 to 1000	1000 to 2000	1800 to 2000	
850 to 1000	1200 to 1400		Each, \$1.50

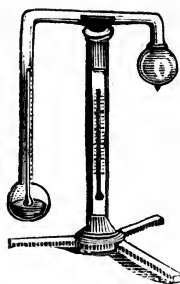
2505.—Ditto, ditto, sets, Specific gravity, from 700 to 2000, finely
and accurately divided, in light glass jars, swelled top, with
wooden feet. Per set, \$3.50
2506.—Jars alone, for the above. Each, .50
2507.—Ditto, for **Specific Gravity**, single spindle, 1000 to 2000,
with thermometer and fine glass jar, in chamois-lined leather
cases. Each, \$5.00



2511



2524



2525

2508.—Hydrometers, for Specific Gravity, two spindles.

Each, \$6.50

2509.—Ditto, ditto, ditto, in fine chamois-lined mahogany cases.

with thermometer and glass cylinder.

Each, \$9.75

2510.—Ditto, ditto, three spindles.

“ 11.50

2511.—Ditto, ditto, six “

“ 14.00

2512.—Ditto, ditto, seven “

“ 16.00

2513.—Ditto, Twaddle's, in sets of six spindles.

No. 1,	0 deg. to	24 deg.,	specific gravity,	1000 to 1120
No. 2,	24 “ to	48 “	“ “	1120 to 1240
No. 3,	48 “ to	75 “	“ “	1240 to 1370
No. 4,	74 “ to	102 “	“ “	1370 to 1510
No. 5,	102 “ to	138 “	“ “	1510 to 1690
No. 6,	138 “ to	180 “	“ “	1690 to 2000

The entire set of six, with spherical bulb.

Each, \$6.00

2514.—Ditto, sets of six, with cylindrical bulb.

“ 5.00

2515.—Ditto, single spindles.

“ 1.25

2516.—Ditto, sets of five spindles, in black walnut box.

“ 5.50

2517.—Ditto, for Urine, French.

Each, .50

2518.—Ditto, ditto, with one spindle, of fine graduation, indicating from 1000 to 1040, with solution tube.

Each, \$2.00

2519.—Ditto, Solution tubes, extra.

“ .25

2520.—Ditto, for Vinegar.

“ .75

2521.—Ditto, Jars, with brass foot.

Each, \$1.50

Ditto, Jars, with glass foot. See Jars.

2522.—Hydrometers, Nicolson's, of japanned tin, for ascertaining the specific gravity of minerals, etc.

Each, \$2.00

2523.—Ditto, ditto, with a set of decimal weights.

“ 4.00

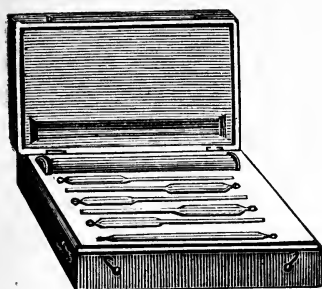
2524.—Ditto, ditto, brass, finely adjusted with a set of weights, all in case, without jar, complete.

Each, \$6.00

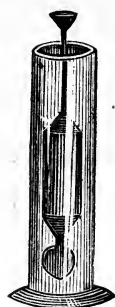
- 2485.—Hydrometers**, for petroleum, etc. Each, \$2.00
2486.—Ditto, for Milk, ordinary style. “ .50
2487.—Ditto, ditto, 0 to 25. “ .75
2488.—Ditto, Milk Essayers, Chevalier, jar and therm'r, “ 1.50
2489.—Ditto, ditto, Quevenne, with jar and thermom'r, “ 1.00
2490.—Ditto, for Most and Wine, French, in tin cases. “ 1.50
2491.—Ditto, ditto, Oechsle's. “ 1.50
2492.—Ditto, for rich Oils, French, Lefebvre, with thermometer in
pasteboard cases. Each, \$2.00
2493.—Ditto, ditto, ditto, 22 to 50. “ 2.00
2494.—Ditto, for Salt. “ .75
2495.—Ditto, **Saccharometers**, French, for testing syrup, in
pasteboard cases. Each, .75
2496.—Ditto, ditto, Beaume's, for Syrups and Sugar. “ .75
2497.—Ditto, ditto, Balling's, for “ “ “ \$1.00
2498.—Ditto, ditto, with thermometer enclosed. “ 2.00
2499.—Ditto, ditto, thermometer and Specific gravity scale extra.
Each, \$2.50
2500.—Ditto, ditto, for testing Sugar and Syrups, according to Dr.
Scheibler. In chamois-lined morocco case, with three spindles,
and cylinder. Each, \$15.00
2501.—Ditto, ditto, for Shellac, one spindle, in pasteboard cases. 1.00
2502.—Ditto, ditto, *Universal*, for **Specific Gravity**, one spindle
registering 700 to 2000, for fluids heavier or lighter than water,
in pasteboard box. Each, \$2.00
2503.—Ditto, ditto, two spindles, 700 to 1000 and 1000 to 2000, in
pasteboard boxes. Per set, \$3.00
2504.—Ditto, ditto, single spindles, in pasteboard boxes.

700 to 850	1000 to 1200	1400 to 1600	
700 to 1000	1000 to 1400	1400 to 2000	
750 to 1000	1000 to 2000	1800 to 2000	
850 to 1000	1200 to 1400		Each, \$1.50

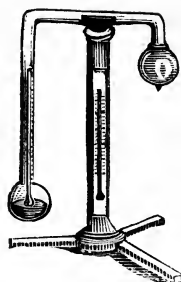
2505.—Ditto, ditto, sets, Specific gravity, from 700 to 2000, finely
and accurately divided, in light glass jars, swelled top, with
wooden feet. Per set, \$3.50
2506.—Jars alone, for the above. Each, .50
2507.—Ditto, for **Specific Gravity**, single spindle, 1000 to 2000,
with thermometer and fine glass jar, in chamois-lined leather
cases. Each, \$5.00



2511



2524



2525

2508.—Hydrometers, for Specific Gravity, two spindles.

Each, \$6.50

2509.—Ditto, ditto, ditto, in fine chamois-lined mahogany cases.

with thermometer and glass cylinder.

Each, \$9.75

2510.—Ditto, ditto, three spindles.

“ 11.50

2511.—Ditto, ditto, six “

“ 14.00

2512.—Ditto, ditto, seven “

“ 16.00

2513.—Ditto, Twaddle's, in sets of six spindles.

No. 1,	0 deg. to	24 deg., specific gravity,	1000 to 1120
No. 2,	24 “ to	48 “ “ “	1120 to 1240
No. 3,	48 “ to	75 “ “ “	1240 to 1370
No. 4,	74 “ to	102 “ “ “	1370 to 1510
No. 5,	102 “ to	138 “ “ “	1510 to 1690
No. 6,	138 “ to	180 “ “ “	1690 to 2000

The entire set of six, with spherical bulb.

Each, \$6.00

2514.—Ditto, sets of six, with cylindrical bulb.

“ 5.00

2515.—Ditto, single spindles.

“ 1.25

2516.—Ditto, sets of five spindles, in black walnut box.

“ 5.50

2517.—Ditto, for Urine, French.

Each, .50

2518.—Ditto, ditto, with one spindle, of fine graduation, indicating from 1000 to 1040, with solution tube.

Each, \$2.00

2519.—Ditto, Solution tubes, extra.

“ .25

2520.—Ditto, for Vinegar.

“ .75

2521.—Ditto, Jars, with brass foot.

Each, \$1.50

Ditto, Jars, with glass foot. See Jars.

2522.—Hydrometers, Nicolson's, of japanned tin, for ascertaining the specific gravity of minerals, etc.

Each, \$2.00

2523.—Ditto, ditto, with a set of decimal weights.

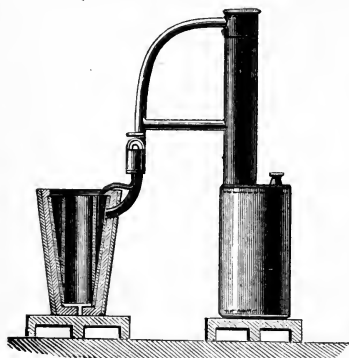
“ 4.00

2524.—Ditto, ditto, brass, finely adjusted with a set of weights, all in case, without jar, complete.

Each, \$6.00

Hydrogen Lamps. See Doeberiner's Lamp.

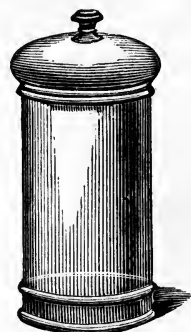
- 2525.—Hygrometers, Daniels'** on polished stand and gilt marks. Each, \$9.00
- 2526.—Ditto, Mason's,** on boxwood stand. " 4.50
- 2527.—Ditto, Saussure's,** hair, mahogany stand. " 4.00
- 2528.—Ditto, ditto,** on brass stand. \$8.00 to 12.00
- 2529.—Ditto, August Psychrometer,** two thermometers, wet and dry bulb, and fine divisions. Each, \$12.00



2530



2534



2539

- 2530.—Ice Freezer, Carré's apparatus,** imported only to order.

\$150.00

It consists of a generator and receiver, made of iron boiler-plate, the receiver being conical in shape, both connected by means of a strong iron tube. In the generator is placed a strong solution of ammonia saturated at 0°, and this is heated over a large gas flame, the receiver meanwhile being immersed in the water. The liquified ammonia passes again into the gaseous state, and is re-absorbed by the water in the generator. But in this evaporation, great cold is produced, and the vessel of water is soon frozen. The ammonia going over can be used indefinitely.

- 2531.—Ditto, Hoffman's apparatus,** in glass, showing the principle of Carré's ice freezer. \$15.00

- 2532.—Ivory Scale, Harcourt's,** for measuring the button in assay, very accurate, made specially to order for me. \$5.00

- 2533.—Ignition Tubes.** Per doz. \$2.50

- 2534.—Indicator of Fire Damp, Electric.** 7.50

The large cup is filled with porous plaster of Paris, and is connected with the bulb-tube opposite to it (which contains a small quantity of mercury), by means of a brass tube. The top of the bulb has a screw cap to hold one of the electrodes. The other electrode is screwed to the base, and connects with large cup; when the porous cup absorbs the fire-damp gas, the mercury presses on the narrow tube, making connection with upper cup, completing the circuit, and ringing the bell.

Infusion Jars. See Jars.

Ingot Moulds. See Moulds.

2535.—Iron Ladle, used in assay, 3 in. .40

2536.—Jars, Battery, glass, cylindrical shape and flat bottom.

4x4	4x5	4½x5½	4x6	4½x6	5½x8 in.
.40	.45	.50	.55	.60	.75 each.
7x8	6x9	8x12	9x12½	9x15 in.	
.80	.85	\$2.00	2.50	3.00 each.	

2537.—Ditto, ditto, fluted, for bichromate potash solution.

Pints, .25

quarts, .50 each.

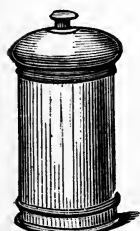
2538.—Ditto, cold cream, French, smooth, rounding and highly glazed inside.

½
.75

1
.85

2 oz.
\$1.00 dozen.

Ditto, chloride of calcium. See Chloride of Calcium.



2540



2542



2543



2544



2550

2539.—Ditto, conserve, with cut-glass covers, and two rings, made of the finest French Baccharat cut crystal. It is the finest quality of glassware in the world, bought by me directly from the factory, and suitable for showing specimens, etc., in show-windows, counters, etc.

Height under the cover, 14	16	18¾ in.
\$7.50	10.00	15.00 each.

2540.—Ditto, ordinary, French, pure white crystal; sides perfectly parallel; single and double rings.

Measure under cover, 27 c. c.	32 to 33 c. c.
\$2.00	3.50 each.

Ditto, Decanting. See Decanting

2541.—Ditto, hydrometer, French, swelled top, polished box-wood feet. Each, .50

2542.—Ditto, ditto, heavy swelled top, with glass feet.

Height, 16	18	24 in.
.75	\$1.00	1.24 each.

2543.—Ditto, ditto, with glass foot and ring around the neck, ground top to receive glass plate.

5x1½	6x1¾	8x1⅝	10x2	10½x1¾	11½x1¾ in.
.30	.35	.40	.45	.50	.55 each.
12½x1¾	13x2	15x2	18x2½	20x2½	25x3 in.
.60	.65	.70	.75	.80	\$2.00 each.

2544.—Ditto, ditto, lipped.

5x⅝	6x1½	7½x1⅝	8x1½	10x2	11½x2½ in.
.30	.35	.37	.40	.45	.50 each.
13x2	15x½	15x2	20½x1	25x3 in.	
.52	.50	.55	.75	\$2.00 each.	

Intermediate sizes of the above jars will be in proportion.

2545.—Ditto, Infusion.

Pints, \$1.50

quarts, 2.00 each.

2546.—Ditto, Leech.

Quarts, .50

galls., \$2.50 each.

2547.—Ditto, Leyden.

½ pt.	1 qt.	½ gall.	1 gall.	2 galls.
\$1.25	1.50	2.50	3.25	4.00 each.

2548.—Ditto, Mercury, glass.

Each, \$1.00 to 1.50

2549.—Ditto, ditto, or Powder, cylindrical, of porcelain, about 4 inches high and 2½ inches diameter, with small opening at the top.

Each, \$1.75

2550.—Ditto, specie, ground tops, if desired.

½ pt.	1 pt.	1 qt.	½ gall.	1 gall.	2 gall.
.15	.18	.25	.35	.50	\$1.00 each.

2551.—Ditto, ditto, fluted sides.

Pints, .30

quarts, .50

2552.—Ditto, ointment, glass, flat shape, swelled tops.

1 oz., \$1.50

2 oz., 2.00 per doz.

2553.—Ditto, ditto, porcelain, glazed, flat covers.

8 oz.	16 oz.	1 qt.	
.60	.75	\$1.25 each.	2554



2554.—Ditto, ditto, fine French choice porcelain, with fire-gilt bands. 1 oz., \$3.50 4 oz., 4.00 per doz.

2555.—Ditto, ditto, white porcelain, conical cover, knobbed.

8	16	32 oz.
.75	\$1.00	1.25 each.

2556.—Ditto, ditto, French, labelled, 17 c. c. high. Each, \$1.30



2557



2561



2563



2564



2565, '66

2557.—Jars, ditto, round, with conical top, knobbed, tall shape, of the very best translucent and highly glazed china porcelain, with fire-gilt decorations, and labelled.

$4\frac{1}{2} \times 2\frac{3}{4}$	$4\frac{1}{2} \times 3\frac{1}{4}$	$7\frac{1}{2} \times 4\frac{1}{2}$	$8\frac{1}{2} \times 4\frac{1}{2}$	$6 \times 3\frac{1}{2}$	$6\frac{1}{2} \times 4\frac{3}{4}$ in.
\$1.50	1.75	2.25	2.50	2.75	2.85
$6\frac{3}{4} \times 4\frac{1}{4}$	$7 \times 4\frac{1}{4}$	$7\frac{1}{2} \times 4\frac{1}{2}$	$8 \times 4\frac{1}{2}$	$9 \times 5\frac{3}{4}$ in.	
\$3.00	3.00	3.15	3.25	3.50 each.	

The above measurements are made under the cover, and are approximate, the actual measure being in millimeters, do not precisely correspond with English measures. These jars are well known to be about the only kind through which ointments will not penetrate.

2558.—Ditto, ditto, ditto, octagonal shape, $4\frac{1}{4} \times 8$. Each, \$2.50

2559.—Ditto, ditto, octagonal and oblong, $4\frac{1}{4} \times 6 \times 7\frac{3}{4}$. " 1.50

2560.—Ditto, Preparation, employed for the collection of anatomical preparations, of fine white and clear glass, having the stoppers thoroughly ground in with fine emery, and provided with glass hook from which to suspend the objects to be preserved.

8 oz.	pts.	qts.	$\frac{1}{2}$ gall.	1	2
.70	.75	\$1.25	1.75	3.00	6.00 each.

2561.—Ditto, ditto, of Bohemian glass, having the mouth parallel with the sides.

2×4	$2\frac{1}{2} \times 5$	$3\frac{1}{2} \times 6$	4×7	6×13	10×8 in.
.50	.75	\$1.15	1.75	6.00	15.00 each.

2562.—Ditto, ditto, with stopper ground into the base of the jar, the top being oval; used for laying down preparations or exhibiting specimens.

4	8	16	32 oz.
.30	.50	.75	\$1.00 each.

2563.—Jets, brass, for hydrogen. Each, .40

2564.—Ditto, ditto, with stopcock and cap. " \$2.00

2565.—Ditto, for washing bottles, ordinary glass, bent. " .06



2582



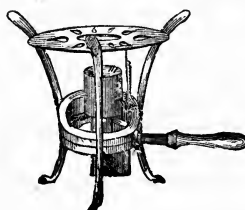
2583



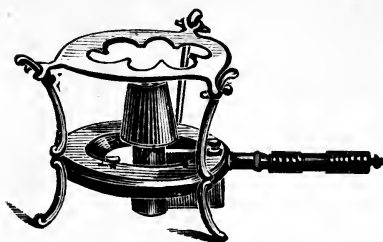
2586



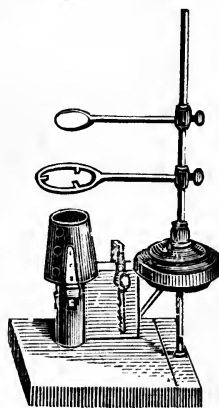
2589



2590



2591



2593

2582.—Ladles, iron, for pouring metals.

3-inch bowl, .40

5-inch, .50 each.

2583.—Ditto, tinned, long handles.

5
.60

5½
.70

6 in.
.80 each.

2584.—Ditto, porcelain, long handles.

Each, .50

2585.—Lamps, for perfuming rooms, without flame.

“ \$1.25

Ditto. See Davy's Safety.

2586.—Ditto, alcohol blast, Russian.

1.50

2587.—Ditto, brass blast, consisting of a large brass reservoir on stand, with jet bearing on a lamp underneath. Each, \$7.50

2588.—Ditto, alcohol, of brass, mounted on three legs, with sheet iron jacket, containing a triangle to hold a crucible immediately over the flame jet; the jacket increases the heat. Each, \$12.00

2589.—Ditto, ditto, Lang's, on tripod, with porcelain handle and support for crucibles, or perforated sheet iron shelf, on top.

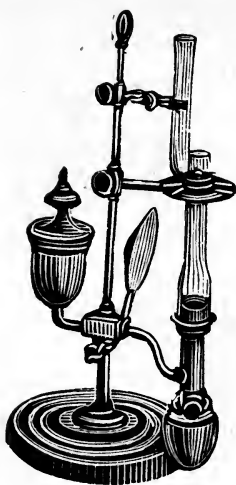
Each, \$3.00



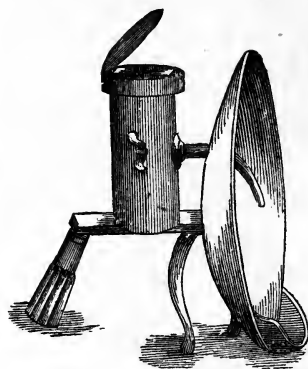
599



2603



2605



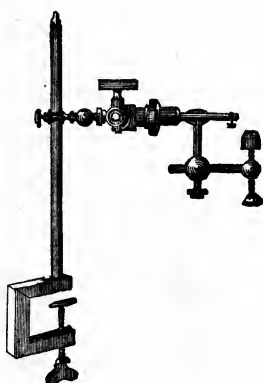
2607

- ✓ **2590.**—Lamps, Berzelius, of brass, on tripod, with triangle perforated shelf, and porcelain handles. Each, \$4.50
- 2591.**—Ditto, ditto, of the very best manufacture, of heavy brass, and highly-polished mahogany and cocoa handles. Each, \$7.50
- 2592.**—Ditto, ditto, of brass, with reservoir about 10 inches distant from the burner, with a stopcock half way on connecting tube to regulate the flow of the spirits. Each, \$6.50
- 2593.**—Ditto, ditto, or Rose's form, on brass stand, with mahogany foot, with rings, triangles, etc. Each \$6.00
- 2594.**—Ditto, ditto, ditto, with porcelain foot. " 7.00
- 2595.**—Ditto, ditto, Müller's modification, mahogany base, having rotary motion around the stand. Each, \$7.00
- 2596.**—Ditto, ditto, or Spirit lamps, of brass.
Small, \$1.00 large, 1.50
- 2597.**—Ditto, ditto, of glass, German, 4 oz., without caps. Each, 20
- 2598.**—Ditto, ditto, with round caps.
4 oz., .50 6 oz., 60 each.
- 2599.**—Ditto, ditto, with large cap and square base.
3 5 8 oz.
.50 .75 \$1.00 each.
- 2600.**—Ditto, ditto, vase form, 3 oz. Each, .50
- 2601.**—Ditto, brass, for blow-pipe, with screw cap, for putting over
Each, \$1.00

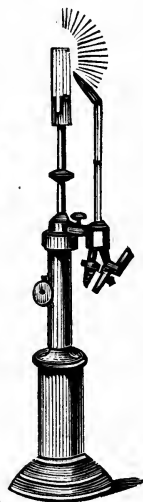
- 2602.—Lamps**, brass, long stem, for heating tubes and soldering.
Each, \$1.25
- 2603.—Ditto**, engravers, the top is to be filled with water to concentrate the light.
Each, \$4.00
- Ditto, hydrogen. See Doeberiner's Lamps.
- 2604.—Ditto**, Plattner's blow-pipe, brass, extra heavy, mounted on stand.
Each, \$3.00
- Lamps, gas. See Burners.
- Lamp Stands. See Supports.
- 2605.—Lamps**, Labratory, large wooden foot, with clamp, reflectors, etc.
Each, \$20.00
- 2606.—Ditto**, Students.
Each, \$2.50 to 4.00
- Ditto, electric. See Electric Lamps.
- 2607.—Ditto**, Magnesium, with fan wheel and clock-work, for burning magnesium ribbon or wire.
Each, \$25.00



2608

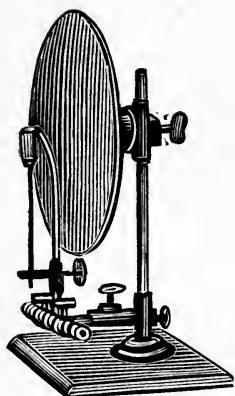


2610



2612

- 2608.—Ditto**, exhydric, of brass, mounted, on stand.
Each, \$7.50
- 2609.—Ditto**, ditto, ditto, larger.
" 16.00
- 2610.—Ditto**, ditto, larger, with extra arrangement for lime holder, moveable joints, etc.
Each, \$20.00
- 2611.—Ditto**, ditto, ditto, very accurately adjusted, silver plated.
Each, \$22.50
- 2612.—Ditto**, ditto, on stand, French, Duboscq's pattern. "
25.00
- 2613.—Ditto**, ditto, on iron stand.
" 20.00
- Ditto, cylinders. See Burner Furnaces.



2613



2620



2621



2622



2623



2628

2614.—Lamp Wicks, for Berzelius's, Rose's, Müller's, etc.

Per doz., .25

2615.—Ditto, for Plattner's blow-pipe lamp.

Per yard, .25

2616.—Lead Trays, for etching, on glass, with hydrofluoric acid.

Each, .40

Lead Retorts, for making hydrofluoric acid. See Retorts.

2617.—Leaf, Dutch.

Per book, .25

2618.—Ditto, Gold.

" \$1.00

2619.—Ditto, Silver.

" .75

2620.—Leech Tubes.

Per doz., 1.00

2621.—Lenses, magnifying, for assayers' use, or reading fine print, etc.

Each, \$2.50

2622.—Ditto, Coddington, brass.

Small, \$2.25

large, 2.50 each.

2623.—Ditto, Stanhope, German silver, for examination of minerals.

Small, \$2.00

large, 2.50 each.

2624.—Ditto, ditto, silver.

Small, \$2.50

large, 3.50 each.

2625.—Ditto, ditto, silver, with cap, to keep the dust from them, small.

Each, \$3.50

2626.—Ditto, horn cases, single.

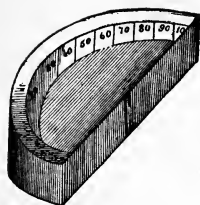
9 lines, .75

11 lines, \$1.00 each.

2627.—Ditto, ditto, double glasses.

9 lines, \$1.25

12 lines, 1.50 each.



2632



2633



2635



2636

2628.—Lenses, horn cases, triple glasses.

9 lines, \$1.50

11 lines, 1.75 each.

2629.—Ditto, Photographic, Steinheil, of Munich, a very correct and clear glass. \$30.00

2630.—Ditto, watchmakers. 2.50

✓ **2631.—Ditto, a set of convex and concave, in a box.** 2.50

Liebig's Potash Bulbs. See Potash Bulbs.

2632.—Light, Refraction of, apparatus for. 5.00

✓ **2633.—Light Recomposition, revolving disc, with prismatic colors, arranged consecutively.** \$2.50

2634.—Litmus Papers, blue, red or neutral, for test papers.

Per sheet, .05

See also Tumeric Paper.

2635.—Litre Bottles, stoppered and accurately gauged.

50 cc.	100	150	250	300	$\frac{1}{2}$ litre	1	2
.35	.45	.50	.75	.85	\$1.00	1.10	1.50 each.

2636.—Litre Flasks.

30 cc.	50	100	200	$\frac{1}{4}$ litre	$\frac{1}{2}$	1
.25	.30	.40	.60	.65	.85	\$1.00 each.

2637.—Ditto, ditto, two marks on the neck.

50 to 55	100 to 110	200 to 220 cc.
.60	.75	\$1.25 each.

2638.—Limb, Safety, Liebig's.

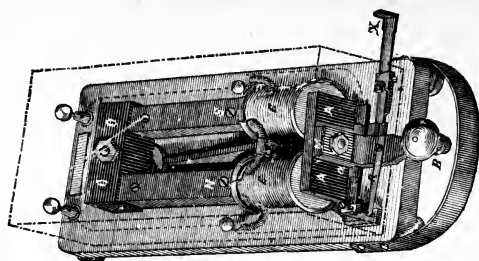
Each, .50

2639.—Magic Lanterns, French, square tin.

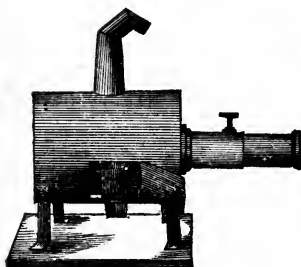
Small	medium	large
\$6.00	10.00	15.00 each.

2640.—Ditto, ditto, black, oval shape, provided with a ratchet screw and pinion for drawing in and out the lenses. Ea. \$25.00

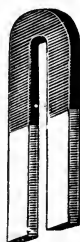
Magic Circles. See Electricity.



6241



2640



2647



2650

2641.—Magneto-Electric Apparatus, new invention, for firing the fuses, etc., in mine blasting. \$100.00

In this apparatus the armature *A A* is always in contact with the poles of the magnet *N, O, S*. It is supported by a piece of metal, *B M*, which turns around a horizontal axis, *a*; this piece presents a kind of handle, *B a*, having a knob at *B*, upon which one strikes with the finger in order to produce the withdrawing of the armature; thus, at the moment of this withdrawal, a first induction current is produced, passing contemporaneously with the movement which causes it, through the wire surrounding the extremities of the magnet. As long as one keeps the armature withdrawn from the magnet, the apparatus is inert; but as soon as one ceases to bear down on the button *B*, the armature, impelled by a spring which acts on the lever *a B*, drawn besides by the magnet, it turns instantly to the contact of the poles *N S*; a second current is produced in a contrary direction to the first, of equal intensity, as can be easily demonstrated with the galvanometer. There is also connected with the instrument a stop *X*, the employment of which holds the armature in a fixed position, so that it is impossible for electricity to pass. This instrument works in all weathers; and, while it is impossible to fire the fuse when the stop *X* is placed upon the armature, a simple withdrawal of the stop *X*, and a smart rap of the finger upon the handle *B*, will instantly fire a fuse by the electric current through a wire 500 to 600 yards in length.

2642.—Magneto-Electric Machine, in black walnut box, with battery, complete. \$10.00

2643.—Magneto-Electric Machine, fine polished mahogany box, with Universal lock. \$35.00

2644.—Magnesium, ribbon and wire. Per foot, .06

2645.—Ditto, ditto, ditto. Per ounce, \$3.25

2646.—Magnets, steel, straight. Each, 1.00

2647.—Ditto, Horseshoe, best English quality.

$2\frac{3}{8}$	3	$3\frac{1}{2}$	4	5	6	10 in.
.25	.30	.60	.75	.90	\$1.25	2.50 each.

2648.—Ditto, Horseshoe, compound. Each, \$4.00

2649.—Ditto, pair of bar, in box. " 3.50

2650.—Magnetic Needle, on stand. 1.75

2651.—Ditto Dipping Needle, with brass stand, simple form. 2.00

2652.—Ditto, ditto, more elaborate. 8.00

2653.—Ditto, Toys, in boxes. .50 to 1.50

Marchand's Drying Tube. See Chloride of Calcium Tube.

2654.—Mariotte's Law, apparatus for. \$10.00

Marsh's Arsenic Test. See Arsenic.

2655.—Matrasses, Bohemian, round bottom, long neck.

4	8	16	24	32 oz
.20	.30	.35	.40	.45 each.

See also Bolt Heads.

2656.—Measures, gutta percha, tall.

1 quart, \$3.00 $\frac{1}{2}$ gallon, 3.50 each. 2659

2657.—Ditto, conical, quart. Each, \$3.00

2658.—Ditto, Harcourt's, for assayers, ivory, very accurate. " 5.00

2659.—Ditto, lead, for blow-pipe apparatus. " .50

2660.—Ditto, porcelain, with handle and lip.

2	4	8	16 oz.
.35	.55	.75	\$1.00 each.

Mechanical Powers. See Apparatus, Mechanics.

2661.—Mercury Box, earthen, oblong, glazed, 2x5. .75

2662.—Ditto, Bottles, or Flasks of iron. Each, \$1.50

2663.—Ditto, Jar, or Powder Cup, porcelain, 5 lbs. 1.50

2664.—Ditto, ditto, glass.

16	18	24 in.
\$1.00	1.50	2.00 each.

2665.—Mercurial Receiver, Cooper's, plain, small. .50

2666.—Ditto, ditto, larger. \$1.00

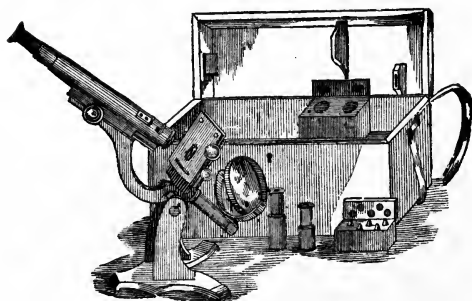
2667.—Ditto, ditto, stoppered at the top. 1.50



- 2668.—**Mercurial Receiver**, graduated, plain. \$1.25 to 1.50
 2669.—**Mercury Shower**, through porous wood. 3.00
 2670.—Ditto, **Trough**, porcelain, to hold 5 lbs. 1.00
 2671.—Ditto, ditto, to hold 16 lbs. 2.00
 2672.—**Metre Measures**, graduated to millimeters on one side, English inches on the other side, graduated by government standard, folding together in short lengths for the pocket, of box-wood. Each, .50
 2673.—Ditto, ditto, ditto, of ivory. “ \$2.25
 2674.—Ditto, ditto, fine ivory ruler, or paper cutter, for the desk, with a knob in the center. Each, \$7.50
 2675.—Ditto, ditto, ivory, small, graduated 10 to 12 centimeters.
 2676.—**Microscopes**, No. 1, Universal joint, on flat standard, small. Each, \$7.50
 2677.—Ditto, ditto, No. 3. “ 10.00
 2678.—Ditto, ditto, No. 4. “ 15.00
 2679.—Ditto, No. 1, supported on two columns, with thumb screw, allowing the tube to rest in an upright or vertical position, having two objectives and a jointed light reflector. Ea. \$25.00
 2680.—Ditto, ditto, by Natchez, compound. “ 20.00



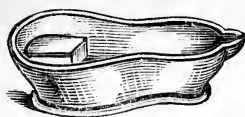
2668



2681

- 2681.—Ditto, large, Gundlach's, English stand, thumb screw delicately adjusted, in fine polished mahogany case, lock and key, with strap for carrying, two eye pieces, five objectives, including one of his fine immersion lenses of very high power, slides, chamois skin, etc. \$225.00

The high reputation of this celebrated manufacturer is too well known to need any further description of the foregoing instrument; it is precisely the same make and character in every particular as the one I exhibited at the meeting of the American Association for the Advancement of Science, held at Troy, which was so favorably spoken of in the notice of their proceedings.



2671



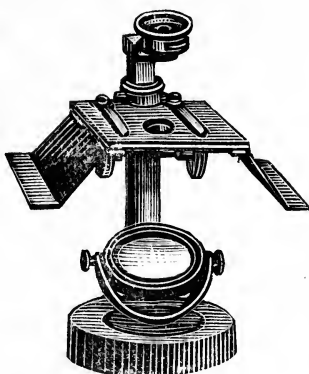
2688



2690



2692



2680



2693

- 2682.—Microscope**, solar, complete, with all the appurtenances, in fine polished box, comprising colored glasses, mounted, several objectives, manufactured expressly for me by the manufacturer for the University of Vienna. \$200.00

Ditto, pocket. See Loups or Lenses.

Ditto, aplanatic, Steinheil. See Photographic Lenses.

- 2683.—Microscopic Covers**, circles. Per doz., .35

- 2684.—Ditto**, ditto, ditto. Per ounce, \$4.00

- 2685.—Ditto**, ditto, square. Per doz., .30

- 2686.—Ditto**, ditto, ditto. Per ounce, 3.00

- 2687.—Ditto**, Slides. Per doz., .70

Minerals. See full list and description at the latter part of this book.

- 2688.—Mineralogists' Slates**, of unglazed porcelain, for showing the streak. $2 \times 2\frac{1}{2}$, .40 $4 \times 5\frac{3}{4}$, .50 each.

Mineralogical Hammers. See Hammers.

Minim Glasses. See Graduates.

- 2689.—Miser's Plate.** \$2.50

- 2690.—Mixing Capsules**, of brass, for blow-piping and assay, according to size. .50 to \$1.00

Larger sizes made to order.

- 2691.—Ditto**, ditto, horn. Each, .25

- 2692.—Ditto**, **Bottles**, ground stoppered, carefully ground and graduated. 500 c. c., \$2.50 1000 c. c., \$3.50

- 2693.—Ditto**, **Jars**, carefully ground and stoppered.

500 c. c., \$2.50

1000 c. c., \$4.50

2694.—Models, of Crown Diamonds, imported to order, comprising four of the largest crown diamonds. Each, \$20.00

Ditto, of Precious Stones, Crystals, etc. See Collections.

Models of Mining Machinery, Tools, Furnaces, etc., as employed in the School of Mines at Freiburg, Saxony; duty free; imported only to order, viz:

- 2695.—Model**, of Arch Protector. \$6.00
- 2696.—Ditto**, amalgamating apparatus. 40.00 to 45.00
- 2697.—Ditto**, of apparatus, for the Ascent and Descent of men in a mine. 18.00 to 25.00
- 2698.—Ditto**, of deep Shaft Bucket-lift, with bucket. 7.50
- 2699.—Ditto**, of shallow Shaft and Bucket-lift, with bucket. 7.50
- 2700.—Ditto**, of iron Bucket-lift, with bucket. 18.00
- 2701.—Ditto**, of Buddle, for stamp ore. 9.00
- 2702.—Ditto**, Horse Capstan. 60.00
- 2703.—Ditto**, Miners' Cage. 3.00
- 2704.—Ditto**, Mulderhutte Cinder hoister. 37.50
- 2705.—Ditto**, Hydraulic Composing-machine. 30.00
- 2706.—Ditto**, usual form Composing-machine. 12.00
- 2707.—Ditto**, of Constructing Tools, various. 150.00 to 210.00
- 2708.—Ditto**, Patterson's Concentration Apparatus. 60.00
- 2709.—Ditto**, "Crab," for hauling and heaving vessels into dock. \$12.00
- 2710.—Ditto**, of ore.
- 2711.—Ditto**, of ore Crushing Machine, with lifter. 350.00
- 2712.—Ditto**, ditto, without lifter. 225.00
- 2713.—Ditto**, of round Buddle, for dressing stamped ore. 45.00 to 52.50
- 2714.—Ditto**, of Buddle stationary frame. 45.00 to 52.50
- 2715.—Ditto**, of cylindrical blast Bellows, in wood. 87.50
- 2716.—Ditto**, ditto, ditto, in metal. 225.00 to 315.00
- 2717.—Ditto**, of Driving Ton, for flat shaft. 2.50
- 2718.—Ditto**, of Delivery shaft. 2.50
- 2719.—Ditto**, of separating Drum for well hole. 15.00
- 2720.—Ditto**, of Drill, with drilling apparatus. 75.00 to 90.00
- 2721.—Ditto**, of steam Engine, with horizontal cylinder and paddle-wheel movement, in wood. \$45.00 to 60.00
- 2722.—Ditto**, ditto, ditto, in metal. 225.00 to 300.00
- 2723.—Ditto**, steam Engine, with working beam, in wood. \$120.00 to 150.00

- 2724.—**Model**, steam Engine, in metal. \$270.00 to 375.00
- 2725.—Ditto, of steam Engine, with air-condensing cylinder, in wood. \$135.00 to 165.00
- 2726.—Ditto, ditto, ditto, in metal. 250.00 to 350.00
- 2727.—Ditto, oscillating steam Engine, in wood. \$150.00 to 200.00
- 2728.—Ditto, ditto, ditto, in metal. \$300.00 to 450.00
- 2729.—Ditto, water-pressure Engine, complete. \$150.00 to 450.00
- 2730.—Ditto, Extraction apparatus \$30.00
- 2731.—Ditto, of refining Forge, German. \$15.00
- 2732.—Ditto. Hartz linen-covered Frame, for dressing slime. \$18.00
- 2733.—Ditto, annealing Furnace, or oven. 25.00
- 2734.—Ditto, assay Furnace. 12.00
- 2735.—Ditto, blast Furnace, for iron. 37.50
- 2736.—Ditto, cupola Furnace, with ventilator. 37.50
- 2737.—Ditto, ditto, ditto, without ventilator. 24.00
- 2738.—Ditto, Freiburg Furnace, with double draft. 21.00
- 2739.—Ditto, ditto, lead Furnace. 18.00
- 2740.—Ditto, Hartz lead Furnace. 27.00
- 2741.—Ditto, puddling Furnace. 24.00
- 2742.—Ditto, iron refining reverberatory Furnace. 60.00
- 2743.—Ditto, reverberatory smelting Furnace. 22.50
- 2744.—Ditto, English reverberatory smelting Furnace. 60.00
- 2745.—Ditto, Mansfield roasting Furnace, with double draft. 22.50
- 2746.—Ditto, of reverberatory Furnace, for the concentration of copper ore. \$55.00
- 2747.—Ditto, of Hungarian reverberatory roasting Furnace. 33.00
- 2748.—Ditto, English roasting Furnace, with four work openings. \$35.00
- 2749.—Ditto, muffle roasting Furnace. 33.00
- 2750.—Ditto, Furnace, for silver refining. 27.00
- 2751.—Ditto, Mansfield "Spectacle" Furnace. 12.00
- 2752.—Ditto, Saxony Furnace, for tin ore. 10.00
- 2753.—Ditto, Furnace, for zinc ore. 45.00



2726

2754.—Model, curved Furnace, or oven.	12.00
2755.—Ditto, of Gold washing machine.	30.00
2756.—Ditto, of lift Hammer, in wood.	24.00
2757.—Ditto, ditto, ditto, in metal.	45.00
2758.—Ditto, steam Hammer, in wood.	37.50
2759.—Ditto, ditto, ditto, in metal.	67.50
2760.—Ditto, forge Hammer, of wood.	24.00
2761.—Ditto, ditto, ditto, of metal.	40.00
2762.—Ditto, tilt Hammer.	24.00
2763.—Ditto, of Hearth of a foot wall.	9.00
2764.—Ditto, Freiburg refining Hearth.	50.00
2765.—Ditto, English refining Hearth.	30.00
2766.—Ditto, of inclined Plane, with drawing weights.	36.00
2767.—Ditto, of Cross Lever, in wood.	7.00
2768.—Ditto, ditto, ditto, in iron.	\$12.00 to 18.00
2769.—Ditto, of Machine, for ore washing.	15.00
2770.—Ditto, ore Mill, with water wheel.	125.00
2771.—Ditto, ore Mill, without “	100.00
2772.—Ditto, stamp Mill, for two wet and one dry charge, with wheel.	75.00
2773.—Ditto, ditto, ditto, ditto, without wheel.	45.00
2774.—Ditto, of rolling Mill, for bar iron, in wood.	57.00
2775.—Ditto, ditto, ditto, in metal.	275.00
2776.—Ditto, warm air Oven.	15.00
2777.—Ditto, hand Pump.	7.50
2778.—Ditto, Rail “Dog,” with truck, English.	15.00
2779.—Ditto, ditto, ditto, without truck, Hungarian	7.50
2780.—Ditto, plain Reel.	6.00
2781.—Ditto, of sinking Shaft, of iron.	37.50
2782.—Ditto, ditto, ditto, of wood.	22.50
2783.—Ditto, ditto, ditto, with round wall.	30.00
2784.—Ditto, upright Shaft and under-ground workings.	225.00
2785.—Ditto, Shaft timbering, for hoisting windlass.	12.00
2786.—Ditto, Screening, or Sifting Machine.	40.00
2787.—Ditto, Sweep Table.	18.00
2788.—Ditto, of “Dolly Tub.”	2.50
2789.—Ditto, Trunks, for the precipitation of the slimes in stamping mill.	\$40.00 to 45.00
2790.—Ditto, Ventilator, as used in the Hartz mines.	22.50

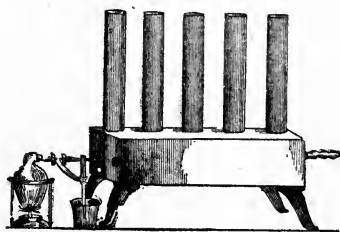
- 2791.—**Model**, Ventilator, according to Fabry's method. 75.00
 2792.—Ditto, ditto, ditto, Karsten's method. 37.50
 2793.—Ditto, under-ground working of mines, with ridging and stoping; also chambering and mason-work up to the deposit bed. \$45.00 to 60.00
 2794.—Ditto, Wheel-barrow. 3.00
 2795.—Ditto, of tread Wheel. 15.00
 2796.—Ditto, hand Windlass. 22.00
 2797.—Ditto, turning Wheel 40.00
 2798.—Ditto, Water-wheel, Forneron's method. \$60.00 to 75.00
 2799.—Ditto, ditto, Chouvel's. 60.00 to 75.00
 2800.—Ditto, ditto, Schwamkrug's, with vertical motion. 75.00
 2801.—Ditto, ditto, overshot. 30.00
 2802.—Ditto, ditto, undershot. 22.50
 2803.—Ditto, ditto, breast. 30.00
 2804.—Ditto, ditto, for back water. 30.00
 2805.—Ditto, ditto, for drawing engine according to Schwamkrug's method. \$270.00
 2806.—Ditto, Water-wheel tools, as used by Schwamkrug. 235.00
 2807.—Ditto, of the two above-mentioned, in one collection. 425.00
 2808.—Ditto, Water-whim, with crate of iron. \$150.00 to 225.00
 2809.—Various models of shaft, pit, and underground timbering and mason-work, for mines. \$5.00 to 10.00

Other models can be made by the same manufacturers, in metal or in wood, accompanied with full drawings and descriptions.

- 2810.—**Monochromatic Light Apparatus**, for showing Sodium Flames, complete, with lamp, after Dr. Morton. \$12.00

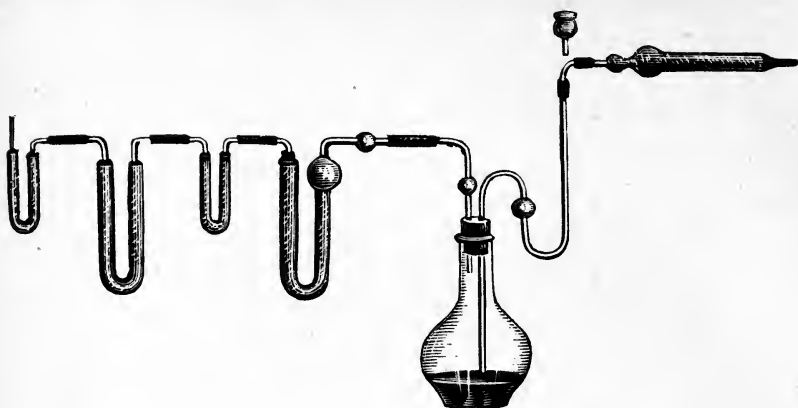
- 2811.—**Mulders' Absorption Meter**, for determination of carbonic acid from all bases, according to Fresenius. \$5.00

Mohr's Apparatus, various, distributed under different headings throughout the Catalogue.



2810

- 2812.—**Mordaunt Cloth**, for dyers' test. Per yd., \$2.00
 2813.—**Mouth Pieces**, of horn, for blow-pipes, trumpet shape; also cylindrical and trumpet combined. Each, .25



2811

2814.—Mouth Pieces, cylindrical, of ivory. Each, .50

2815.—Ditto, ditto, of turned wood, for inhaling gases, or to attach to gas bladders. Each, .25

2816.—Ditto, ditto, of bone, for inhaling bags. Each, .25 to \$1.00



2817



2818



2820



2821



2822



2823



2827

2817.—Ditto, ditto, box-wood, for nursing bottles. .25

2818.—Mortars, agate, with pestles.

$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$	2	$2\frac{1}{8}$ in.
\$1.90	2.00	2.15	2.20	2.25	3.00	3.25 each.
$2\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{1}{2}$	$2\frac{5}{8}$	$2\frac{3}{4}$	$2\frac{7}{8}$	3 in.
\$3.75	4.00	4.50	5.00	5.50	6.00	7.00 "
$3\frac{1}{4}$	$3\frac{1}{2}$	4	$4\frac{1}{4}$	5	$5\frac{1}{4}$	$5\frac{1}{2}$ in.
\$8.50	9.00	15.00	17.00	20.00	25.00	30.00 "

2819.—Ditto, ditto, mounted in wood. Extra.

Each, \$1.00

Ditto, diamond. See Diamond Mortars.

2820.—Mortars, glass, with lip and pestle, shape conical.

Nos.	1176	1175	1174	1173	1172
Size,	3½	3¼	4¼	4¾	4½ in.
Price,	.75	\$1.00	1.25	1.50	1.75 each.

2821.—Ditto, hemispherical, glass, with pestle.

	2	3	5	6 in.
	.30	.35	.65	\$1.00 each.

2822.—Ditto, iron, bell shape.

4 oz.	8	16	32	½ gall.	1	2
.40	.70	\$1.00	1.25	2.00	3.50	4.75 each.

Ditto, iron. Other styles, special prices.

2823.—Ditto, porcelain, emulsion, with pestle and strainer.

Each, \$2.00

2824.—Ditto, ditto, with knobbed handles on either side, containing ½ gallon. Each, \$5.00

2825.—Ditto, ditto, ditto, ditto, 1 gallon. “ 8.00

2826.—Ditto, ditto, ditto, ditto, 1 “ emulsion, sharp lipped, and ring around the top, cover and porcelain handles. Each, \$6.50



2829



2830



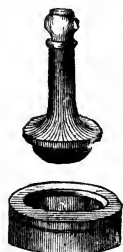
2831



2834



2835



2836

2827.—Ditto, ditto, deep mixing, glazed outside.

Nos.	0	1	2	3	4	5	6	7	8
Diam.,	3	3¼	4¼	5½	6	7	8	9¾	in.
Price,	.45	.60	.75	\$1.00	1.25	1.50	2.00	3.00	4.50 each.

2828.—Ditto, ditto, ditto, glazed throughout.

Nos.	0	1	4	6
	.55	.70	\$1.25	2.50 each.

2829.—Ditto, ditto, shallow, for powders, glazed on the outside, with or without lip.

Nos.	00	0	1	2	3	4	5	6
Size,	2½	2¼	3	3¾	4½	5	5¾	6¼ in.
Price,	.35	.40	.50	.60	.70	.75	.80	\$1.00 each.
Nos.	7	8	9	10	11	14	16	
Size,	7	7½	8¼	9	9¾	12¼	14¼	in.
Price,	\$1.25	1.40	1.65	1.85	2.00	5.50	18.00	each.

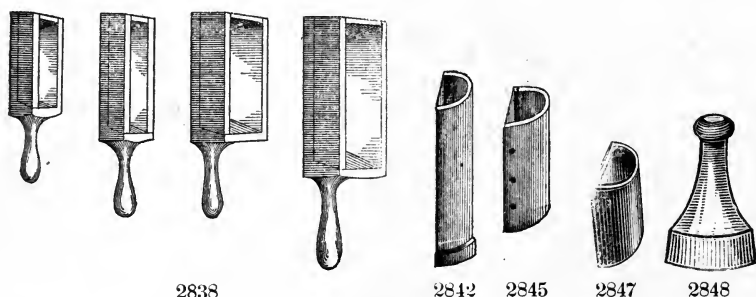
2830.—Mortars, wedgewood.

Nos.	0000	000	00	0	1	2	3	4
Price,	.40	.50	.55	.65	.70	.90	\$1.10	1.40 each.
Nos.	5	6	7	8	9	10	11	12
Price,	\$1.70	2.00	2.50	3.50	4.00	4.50	5.25	6.00 “

2831.—Ditto, steel polished inside and out.

3 inches, \$2.00

6 inches, 5.00 each.

2832.—Moulds, of boxwood, for rolling the paper for cartridge cases in blow-piping. Each, .20**2833.—Ditto, ditto, with pestle, for forming clay basins in blow-piping.** Each, .75**2834.—Ditto, brass, for making charcoal crucibles in quantitative blow-pipe analysis, in four pieces.** Each, \$4.25**2835.—Ditto, ditto, for making cupels.** Each, \$2.50 to 4.50**2836.—Ditto, ditto, for making scorifiers.** “ 5.00 to 7.00**2837.—Ditto, charcoal of wood, for forming oblong charcoal pieces.** Each, \$1.25**2838.—Ditto, iron, for making gold and silver ingots.**

Each, \$1.50 to 2.50

2839.—Ditto, steel, for cupelling before the blow-pipe, two sizes and two pestles, with support. Each, \$2.75**2840.—Ditto, suppository.** “ 7.50**2841.—Muffles, sand, large.** “ 1.50**2842.—Ditto, ditto, ditto, for Hibb's furnaces, fire clay.** “ 1.25**2843.—Ditto, ditto, for Kent's furnaces, round ends.** “ .35**2844.—Ditto, French, thin and strong, No. 5, $2\frac{3}{4} \times 3\frac{1}{2}$.** “ .30**2845.—Ditto, ditto, ditto, No. 6, $2\frac{1}{2} \times 3\frac{3}{4}$.** “ .35**2846.—Ditto, ditto, ditto, No. 7, $3 \times 4\frac{1}{2}$.** “ .45

2847.—Muffles, French clay, best.

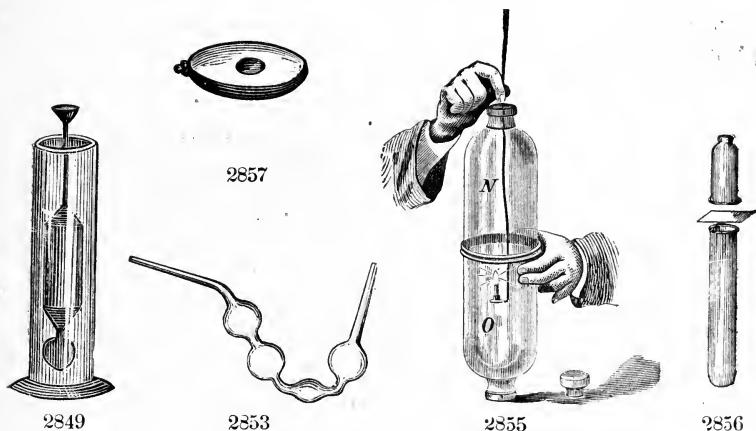
<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>
3	3½	4¾	3¼	4½	4¼	4¾	4¾	3½
3½	4¼	5	4¾	5½	6	6¼	7½	4½
4¾	6	6¼	7¼	7¾	8	8½	10	11

Price. .50 .60 .70 .75 \$1.00 1.10 1.20 1.50 2.00 each.

2848.—Mullers, Glass. 3 in., \$1.25 4 in., 2.25.

Slabs for above. See Plates.

Ditto, Agate. See Agate Slabs, with Muller.

**2849.—Nicholson's Hydrometers, for ascertaining Specific**

Gravity of solids, minerals, etc., made of brass. Each, \$4.00

2850.—Ditto, ditto, ditto, including jar. " 6.00

2851.—Ditto, ditto, ditto, of tin. " 2.00

2852.—Nitrogen Bulb, Will & Varrentrapp's, 3 bulbs. " .65

2853.—Ditto, ditto, ditto, 4 " " .75

2854.—Ditto, Limbs, Liebig's, for connection. " .75

2855.—Nitrous Oxide Gas, apparatus for forming. " 3.50

2856.—Ditto, ditto, ditto, smaller. " 2.50

Nipper Taps. See Pinch Cocks.

2857.—Nipple Shells, French, with ring. Per doz., 4.50

2858.—Nursing Bottles,
ditto. Per doz., \$1.25

2859.—Ditto, ditto, corks.

Per doz., \$.50

2860.—Ditto, ditto, tops

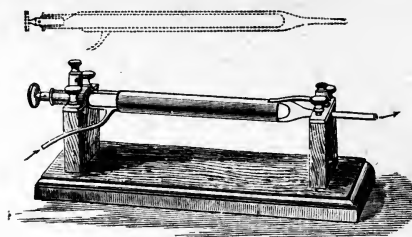
box-wood. Per doz., \$1.00



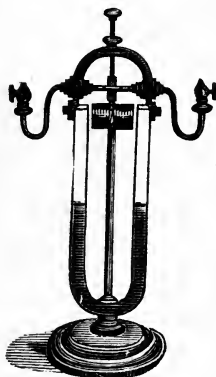
2858



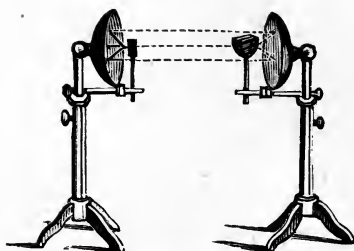
2861



2862



2865



2878

2861.—Oil Receivers, Florentine.

Pints, .75

quarts, \$1.00 each.

Organic Analysis. See Apparatus for.**Optical Apparatus.** See Optics.**Oxygen Retorts.** See Gas Generators.**Oxhydrogen Blow-pipe.** See Blow-pipe.**2862.—Ozonometer, Sieman's.****2863.—Ditto, to attach to the new Borchard electrical machine,**
for collecting ozon \$6.00**2864.—Page's Rotating Apparatus.** 16.00**2865.—Ditto, Revolving Electro-Magnet.** 8.00**2866.—Paper, bibulous.** Per bundle of 1000 sheets, 4.50

: Ditto, filtering. See Filtering Paper.

2867.—Ditto, glazed. Per sheet, .05; per quire, .75**2868.—Ditto, litmus.** Per sheet, .05**2869.—Ditto, neutral.** " .05**2870.—Ditto, parchment.** " .25**2871.—Ditto, tea, No. 1.** Per quire, .10

- 2872.—**Paper**, tumeric. Per sheet, .05
 2873.—Ditto, weights .50
 2874.—**Pallettes**, small. Each, .25
 2875.—Ditto, large. “ .30
 2876.—**Pans**, expectorating. “ .25
 2877.—Ditto, for gold washing. “ .50
 Ditto, horn. See Horn Pans.

2878.—Parabolic Reflectors.

13 in., \$16.00 15 in., 25.00 10 in., 13.00

- 2879.—Ditto, ditto, nickleized or silvered, additional. \$2.50



2880



2881



2881



2882



2884

- 2880.—**Perculators**, Mohr's glass and tin. Each, \$8.00

- 2881.—Ditto, of glass. Pints, .50 gall., \$1.00 each.

See also Displacement Apparatus.

- 2882.—**Perfume Bottles**, French, fancy shaped, ground, stoppered with ball top. Per 100, \$7.50

- 2883.—Ditto, ditto, amber and blue diamond, pressed, 1 oz. Ea. .40

- 2884.—Ditto, ditto, ditto, pressed, ball stopper. “ .50

- 2885.—Ditto, ditto, green, cut crystal glass. “ 3.00

- 2886.—Ditto, ditto, square, crystal, cut top. Per doz., 6.00

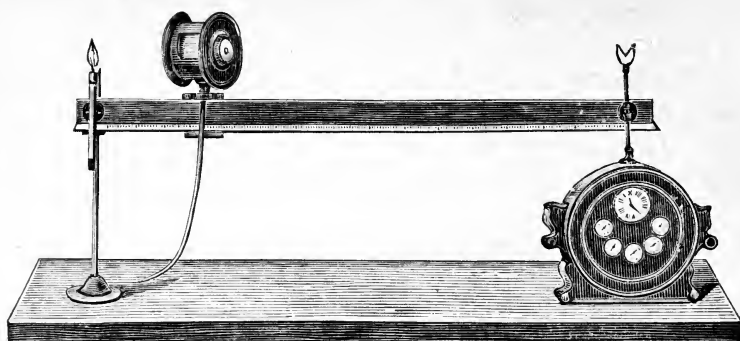
- 2887.—**Pestles**, porcelain. Each, .50

- 2888.—**Photometers**, Bunsen's, graduated, 5 foot bar, with scale, diaphragm and candle holders. Each, \$30.00

- 2889.—Ditto, regulation burner. “ 5.00

- 2890.—Ditto, candles. Per lb., .75

Ditto, Meter. See Gas Meter.

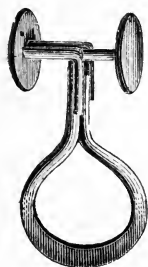


2888

- 2891.—Photographic Baths, porcelain, small. Each, \$4.00
 2892.—Ditto, ditto, ditto, large. " 5.00
 2893.—Ditto, Dishes, porcelain, shallow, with lip, Royal Berlin,
 9 inches. Each, \$2.75
 2894.—Pill Boxes, for rounding and silvering pills. " .75
 2895.—Ditto, tiles.

5
.406
.507 in.
.75 each.

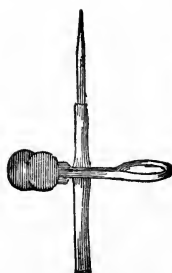
- 2896.—Pincers, gas, with corrugated jaws, for handling gas and
 other pipes, with screw driver on handles. \$1.00 to 1.50



2897



2898



2899



2900



2901

- ✓ 2897.—Pinch Cocks, Mohr's, brass.

Small, .25

large, .35 each.

- 2898.—Ditto, ditto, with bent lip and screw, to regulate the flow
 of liquids.

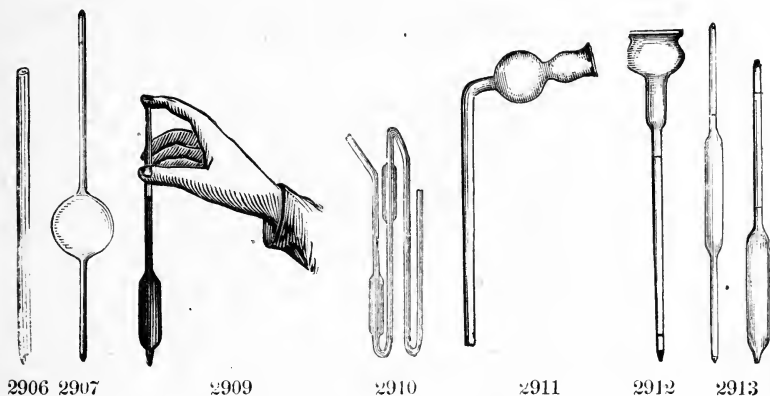
Nos. 1
.302
.403
.504
.60 each.

- 2899.—Ditto, ditto, with rubber attachment and glass tips.

Small, .35

large, .65 each.

- 2900.—Pinch Cocks**, Mohr's, with steel spring and heavy plate brass, with steel bow; having number and register screw in fractions to regulate the drops, in careful estimation. Ea. \$1.75
- 2901.—Ditto**, ditto, brass wire, with protecting plate. " .25
- 2902.—Ditto**, ditto, Bunsen's. Per doz., 7.50
- 2903.—Ditto**, ditto, Dr. Squibb's modification, arranged to employ but one screw. Each, .50
- 2904.—Pipes**, for hydrogen bubbles. " .75
- 2905.—Ditto**, organ; special prices.



2906.—Pipettes, straight, 6 in. long, drawn to the end.

Each, .10; per doz., \$1.00

2907.—Ditto, cylindrical, or ball.

Each, .25

2908.—Ditto, with rubber ball, plain.

" .50

2909.—Ditto, fixed, or volume.

1	2	5	10	20	25	30	50	75	100	150	200 cc.
.15	.20	.25	.30	.35	.40	.45	.50	.65	.85	.90	\$1.00 each.

2910.—Ditto, Ettling's.

Each, .75

2911.—Ditto, filling.

" \$1.00

2912.—Ditto, dropping, graduated, 100 in 10.

.75

2913.—Ditto, Mohr's, graduated.

5	5	10	10	10	15	20 cc.
$\frac{1}{10}$	$\frac{1}{20}$	$\frac{1}{5}$	$\frac{1}{10}$	$\frac{2}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
.70	.75	.75	.90	\$1.00	1.10	1.15 each.
25	25	30	50	50	100	100 cc.
$\frac{1}{5}$	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{10}$	1	$\frac{1}{5}$
\$1.15	1.20	1.20	1.35	1.40	2.00	2.50 each.

2914.—Ditto, ditto, graduated from 0° to 5°,

0° to 10°.

1 in $\frac{1}{100}$ \$1.00

in $\frac{1}{10}$, 75

in $\frac{1}{10}$.85 each.

1 in $\frac{1}{10}$.75

- 2915.—**Pith Balls**, per dozen. .25
 2916.—Ditto, **Birds**, “ \$1.25
 2917.—Ditto, **Images**, per pair. .75
 2918.—**Plates**, brass sliding rod, hook and check screw. Ea. 5.50
 2919.—Ditto, earthen, glazed, 6 inch. “ .25



2920



2925



2924



2926



2928



2933



2934

- 2920.—Ditto, ditto, perforated, with rim around the top, flat.

3	4	4½	5 in.
.25	.30	.35	.40 each.

Ditto, glass. See Covers and Glass Plates.

- 2921.—Ditto, porcelain, deep, rectangular. Each, 1.25

- 2922.—Ditto, ditto, for arsenic and color tests, assorted sizes.

Each, .50 to \$1.00

- 2923.—Ditto, porcelain, perforated. Small, .90; large, \$1.00

- 2924.—Ditto, porous, square.

4½	4¾	5¼	5½ in.
.40	.45	.50	.55 each.

- 2925.—**Platinum Dishes.**

½	¾	1	2	3	4 oz.	Per grain,	.3
---	---	---	---	---	-------	------------	----

- 2926.—Ditto, **Boats**, for combustion.

2¾	2⅞	3⅛ in.	“	.3
----	----	--------	---	----

- 2927.—Ditto, **Spatulas.**

3⅞	3¼	3½	3⅞	4½ in.	“	.3
----	----	----	----	--------	---	----

- 2928.—Ditto, **Spoons**, with or without covers; 2 sizes, “ .3

- 2929.—Ditto, **Scrap.** “ .1½

- 2930.—Ditto, **Sponges**, German. Each, .30

- 2931.—Ditto, ditto, French. “ .75

Ditto, spongy. See Chemicals.

- 2932.—Ditto, **Jets or Tips.** Each, .75 to \$1.00

- 2933.—Ditto, **End Tongs**, steel, double bend. Each, 6.00

- 2934.—Ditto, ditto, German silver, double or single bend. “ 6.50

Platinum Retorts, special prices.

✓ **2935.**—Ditto, **Sheet and Foil**, ordinary size and thickness.

Per grain, $.2\frac{1}{2}$

2936.—Ditto, wire, ditto, ditto, fine as hair.

Per foot, .25

2937.—Ditto, Foil, very thin for batteries.

Per grain, $3\frac{1}{2}$

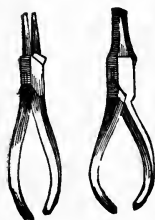
✓ **2938.**—Ditto, **Wire**, for blow-pipe.

Per foot .30 to .60

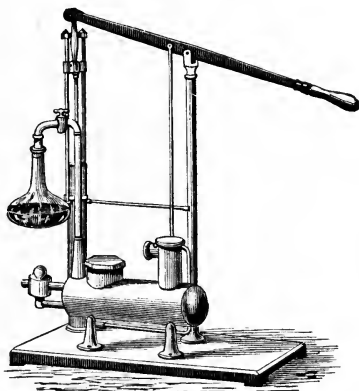
Ditto, ditto, and **Foil Gauze**.



2939, 2946



2941



2945

2939.—Ditto, **Covers**. $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{1}{2}$, $1\frac{5}{8}$, $1\frac{3}{4}$, $1\frac{7}{8}$, 2 in. Per grain, 3

2940.—Ditto, **Crucibles**. $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 2, 3 oz., and larger sizes, special to order. Per grain, 3

2941.—**Pliers**, steel wire, round ends, square ends, and cutting ends. Each, \$1.00 to 1.25

Pneumatic Apparatus. See the end of the book.

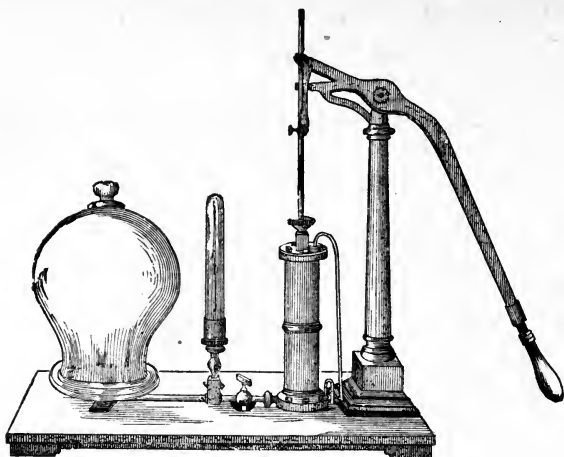
2942.—Ditto, **Cistern**. \$12.00

2943.—Ditto, **Pumps**, Sprengel's mercurial, of glass, in fine polished walnut frame, French make. This article being excessively frail and delicate, is only imported on special order, with deposit, and at the risk of the purchaser. Each, \$150.00

2944.—Ditto, ditto, or lever Air pump, heavy, hard wood frame, 40 inches high, barrel $12 \times 3\frac{1}{2}$ inches, and plate 12 inches in diameter, with manometer attached. Each, \$200.00

2945.—Ditto, ditto, ditto, Carré's, with separate arrangements, for exhausting air and freezing water on same apparatus.

Each, \$150.00



2946

2946.—Pneumatic Pump, on flat base; barrel $8 \times 2\frac{1}{4}$ inches; plate 10 inches diameter, with manometer. Each \$100.00

2947.—Ditto, ditto, with cylinder, $7\frac{1}{2} \times 2\frac{1}{2}$ inches, and plate 8 inches diameter, barrel placed vertically. Each, \$50.00

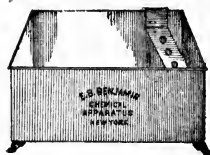
2948.—Ditto, ditto, barrel $7 \times 1\frac{1}{4}$ inches, plate $7\frac{1}{2}$ inches diameter. Each, \$25.00



2951



2952



2955



2956

2949.—Ditto, ditto, barrel, 7×1 inches; plate, 6 inches diameter.

Each, \$18.00

2950.—Ditto, ditto, without any stopcock. “ 15.00

2951.—Ditto, ditto, not mounted, for organic analysis. “ 10.00

2952.—Ditto, ditto, “ “ 15.00

2953.—Pneumatic Trough, of tin, japanned, $9 \times 12\frac{1}{2}$, with shelf

\$2.75

2954.—Ditto, ditto, ditto.

11x15 in., with shelf.

\$3.50

2955.—Ditto, ditto, ditto,

13x16 x12 in., with shelf.

\$5.00

2956.—Ditto, ditto, of best

annealed glass, without a joint, without shelf, 10x5 in.

\$4.50

2957.—Ditto, ditto, ditto,

ditto, 12x6 in.

\$7.00

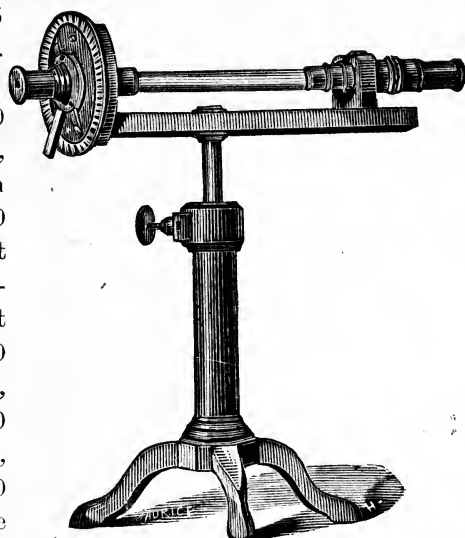
2958.—Ditto, ditto, ditto,

ditto, 14x7 in.

\$8.50

Polariscope. See

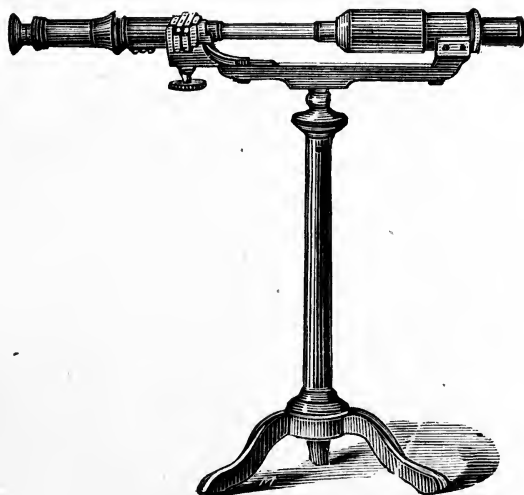
Turmaline Pincers.



2959

2959.—Polarization Apparatus, Mitscherlich's, carefully constructed, on a metallic stand, double tubes.

\$60.00

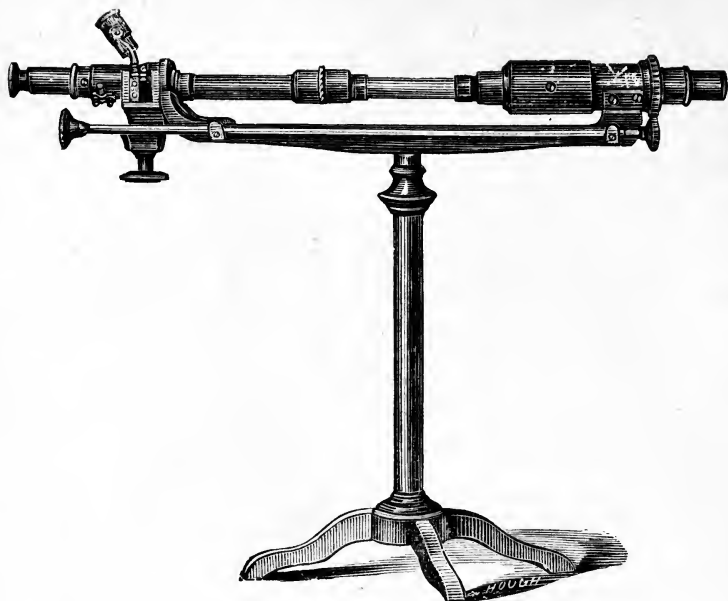


2961

2960.—Ditto, ditto, Wild's, for the examination of sugars, syrups, and beet sugar, in a fine polished mahogany case, with tubes, lamps, etc., complete.

\$175.00

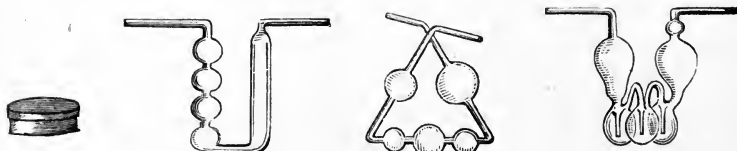
2961.—Ditto, ditto, Soleil's, of finely polished brass, with three



2962

tubes, complete, in a fine polished mahogany box, lock, key, etc., with instructions. \$150.00

- 2962.**—Ditto, ditto, according to Soleil-Ventzke, with microscope for the micrometer scale, 1 tube 100 millimeters, and 1 tube 200 millimeters; complete, with the apparatus and instructions which usually come with this instrument; also having Dr. Scheibler's attestation as to its accuracy, it having been thoroughly tested by him. \$225.00



2964

2965

2966

2968

- 2963.**—Ditto, ditto, Norremberg's, for the analyzing of light. Imported only to order. \$60.00

Pressure Boards. See Gas Bags.

- 2964.**—Pomades, glass. 1 oz., \$1.25 2 oz., 1.50.
Ditto, porcelain. See Jars.

Porous Cups. See Cells.

Ditto, Plates. See Plates.

2965.—Potash Bulbs, Mitscherlich's.	Each, .60
2966.—Ditto, ditto, Liebig's latest form.	" .75
2967.—Ditto, ditto, Mohr's.	" .90
2968.—Ditto, ditto, Geissler's.	" \$1.00



2969



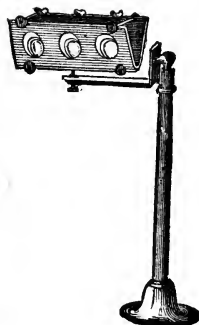
2970



2971



2973



2976

2969.—Ditto, Pipettes. Each, .30

2970.—Precipitating Glasses.

4	8	16	32 oz.	$\frac{1}{2}$	1 gall.
.25	.30	.40	.60	.80	\$1.10 each.

2971.—Preparation Glasses, flat bottom, thin glass.

6x1 $\frac{1}{4}$	7x1 $\frac{3}{8}$	7x1 $\frac{1}{2}$	8x1 $\frac{1}{2}$ in.
\$1.25	1.40	1.50	2.00 per doz.

2972.—Ditto, ditto, round bottom. See Specimen Tubes.

Ditto, Jars. See Jars for Analytical purposes.

2973.—Prisms, hollow bottle, 60 deg. angle. Each, 7.50

2974.—Ditto, ditto, extra fine, ground, of one piece of glass, and carefully stoppered, by Steinheil. Each, \$50.00

2975.—Ditto, ditto, mounted in brass, on stand. " 15.00

2976.—Ditto, ditto, series of 3, mounted. " 30.00

2977.—Ditto, flint glass, 3 in. " .75

2978.—Ditto, ditto, 4 in. " 1.10

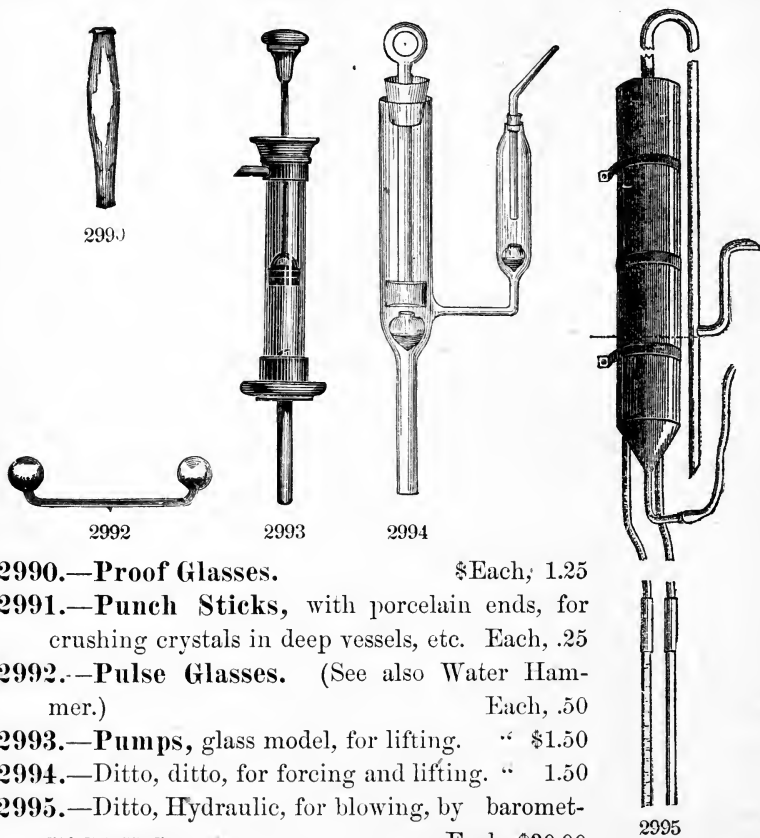
2979.—Ditto, ditto, 5 in. " 2.00

2980.—Ditto, ditto, 6 in. " 3.00

2981.—Ditto, for dark chamber, 15 lines. " 2.00

2982.—Ditto, " " 21 " " 2.50

2983.—Prisms, aeromatic, 30x27 m. m.	Per pair, 5.00
2984.—Ditto, ditto, 35x32 “	“ 6.00
2985.—Ditto, ditto, 40x38 “	“ 7.25
2986.—Ditto, ditto, 45x43 “	“ 9.00
2987.—Ditto, equilateral flint, 33x30 m. m.	Each, 4.00
2988.—Ditto, ditto, 35x33 “	“ 5.00
2989.—Ditto, Nicol's assortment.	Each, \$6.00 to 10.00



2990.—Proof Glasses. \$Each, 1.25

2991.—Punch Sticks, with porcelain ends, for crushing crystals in deep vessels, etc. Each, .25

2992.—Pulse Glasses. (See also Water Hammer.) Each, .50

2993.—Pumps, glass model, for lifting. “ \$1.50

2994.—Ditto, ditto, for forcing and lifting. “ 1.50

2995.—Ditto, Hydraulic, for blowing, by barometric pressure. Each, \$30.00

2996.—Ditto, glass apparatus, for showing the principle of the forcing pump as applied to the fire engine. Each, \$5.00

2997.—Ditto, Bunsen's quick filtering apparatus, consisting of pump, platinum cone, mould and holder, set of funnels, bottles and support. Complete, \$18.00

2998.—Pungents, white, or large open mouthed, ground, stoppered bottles. 1 oz., \$4.50 2 oz., 5.00 per doz.



2999.—Pungents, amber, large open mouthed.

1 oz., \$4.50 2 oz., 5.00 per doz.

3000.—Ditto, cut glass, with ground stopper and hinged silver caps, assorted colors. No. 1, \$20.00; No. 3, 35.00 per doz.

3001.—Ditto, cut glass, union or double ends; one end hinged and the other screw, silver top, assorted colors.

No. 1, \$35.00 No. 3, 45.00 each.

3002.—Ditto, ditto, ditto, gold plated on silver.

No. 1, \$45.00 No. 2, 65.00 each.

3003.—Ditto, cut glass, with ground stopper, and hinged caps, gold plated on silver.

No. 1, \$25.00 No. 3, 40.00 per doz.

3004.—Pyrometers, on mahogany base, with dial and needle, spirit lamp, brass and iron rods. Each, \$6.00

3005.—Ditto, ditto, larger, with spirit reservoir of brass, running the whole length of the apparatus, for heating the rods uniformly, having sliding cap to shut off the flame. \$12.00

Quetschhahne. See Pinch cocks.

Quick Filtering Apparatus. See Filtering Apparatus.

Quilled Receivers. See Receivers.

3006.—Radiator, Leslie's. \$2.50

3007.—Rasps, round, for filing corks.

4	5	6	7	8 in.
.25	.30	.40	.45	.50 each.

Reagents. See Chemicals at the back of the book.

3008.—Reagent Boxes, for sets of 9 reagents, filled. Each, 2.50

3009.—Ditto, ditto, ditto, having places for blow-pipe, platinum box, tweezers, etc., filled. Each, \$4.00

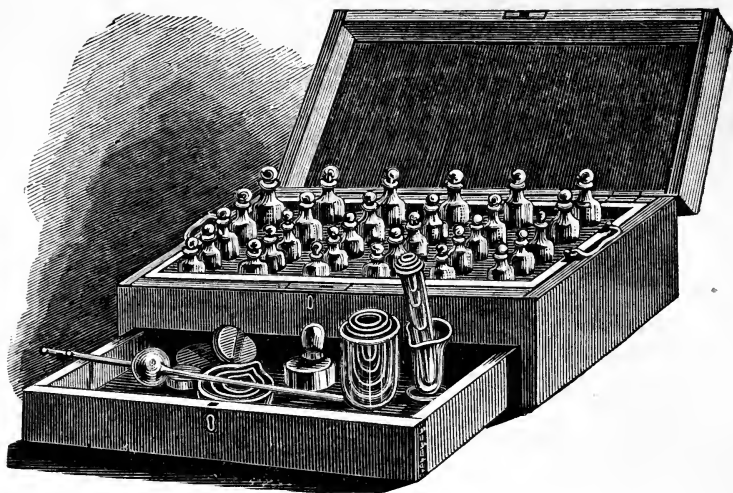
3010.—Ditto, ditto, including blow-pipe, tweezers, etc. " 6.00

3011.—Ditto, **Chests**, medium size. " 10.00

3012.—Ditto, ditto, large. " 12.00

3013.—Receivers, for retorts, plain, genuine Bohemian glass.

2	2½	5 galls.
\$2.00	3.50	5.00 each.



3012

✓ 3014.—Receivers, for retorts, tubulated, unstoppered.

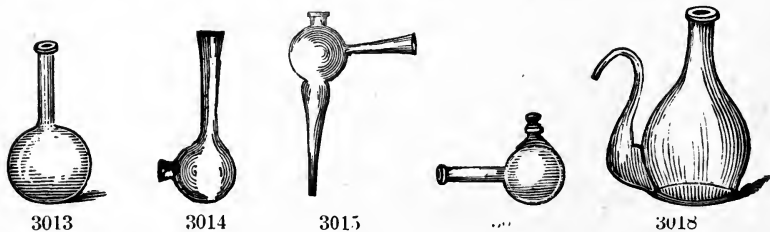
8	16	32 oz.
.45	.55	.70 each.

3015.—Ditto, Bohemian glass, quilled.

8 oz.	16	32	$\frac{1}{2}$ gall.	1
.70	.80	\$1.20	1.70	2.00 each.

3016.—Ditto, glass, tubulated and stoppered.

2 oz.	4	8	16	32	$\frac{1}{2}$ gall.	1
.30	.40	.50	.60	.75	\$1.00	1.50 each.



3017.—Ditto, spherical, long-necked and ring top, tubulatures at the side, of Bohemian glass.

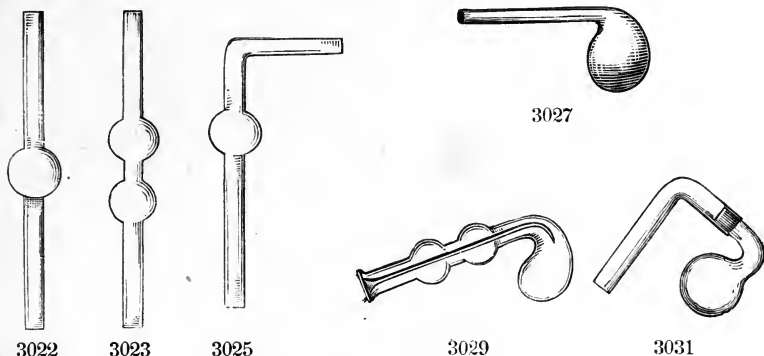
$\frac{1}{2}$	1	2 gall.
\$2.00	3.00	4.00 each.

3018.—Ditto, Florentine, French, plain, quarts. Each, .75

3019.—Ditto, ditto, Bohemian, with ground glass stopper in neck.

1 qt.	$\frac{1}{2}$ gall.	1
\$1.50	2.25	2.50 each.

- 3020.**—**Receivers**, porcelain. 4 oz., \$1.25 8 oz., 1.50 each.
3021.—**Ditto**, earthen-ware, $\frac{1}{2}$ gall. Each, \$1.25



- 3022.**—**Reduction Tubes**, of glass, with 1 bulb. Each .20
3023.—**Ditto**, ditto, ditto, 2 " " .30
3024.—**Ditto**, ditto, ditto, 3 " " .50
3025.—**Ditto**, ditto, ditto, 1 " bent end. " .25
3926.—**Ditto**, ditto, porcelain, for reduction by hydrogen. " 1.25

Reflectors. See Parabolic Reflectors.

- 3027.**—**Retorts**, plain glass, single tube, best Bohemian glass.

1 oz.	2	4	8	16	32	$\frac{1}{2}$ gall.	2	4	7
.20	.25	.30	.40	.45	.60	.90	\$2.25	3.50	6.00 each.

- 3028.**—**Ditto**, ditto, ditto, with double tube, Liebig's.

8 oz., .80

16 oz., \$1.00 each.

- 3029.**—**Retort Glass**, plain Bohemian, two bulbs in the neck.
for preparing oxygen gas from red oxide of mercury.

2	4	6 oz.
.30	.35	.55 each.

- 3030.**—**Retorts**, glass, light, French tubulature, without stopper.
1 oz., .12 2 oz., .15 each.

- 3031.**—**Ditto**, ditto, Clark's, plain, with tube receiver. Each, .50

- 3032.**—**Ditto**, ditto, Faraday's. " .50



3033



3034

- 3033.**—**Ditto**, ditto, best Bohemian, tubulatured and stoppered.

2 oz.	4	8	16	32	$\frac{1}{2}$ gall.	1	3	4	5	7
.35	.40	.50	.55	.70	\$1.20	1.50	3.50	4.50	7.00	9.00 each.

3034.—Retorts, porcelain, best, glazed inside, tubulated and stoppered.

4	8	16 oz.
\$1.40	1.65	1.90 each.

3035.—Ditto, ditto, detached heads. Each, \$1.50

3036.—Ditto, glass, German, for micro-chemical operations, plain, assorted sizes. Per doz., \$2.50

3037.—Ditto, tubulated and stoppered. “ 3.50

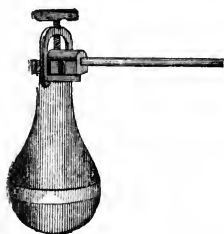
Retort Funnels. See Funnels.

3038.—Retorts, stoneware.

4	8	16	32 oz.
\$1.00	1.25	1.50	2.00 each.

3039.—Ditto, iron, loose cover.

$\frac{1}{2}$	1	2	3	4	8	16 pts.
\$2.75	3.00	3.75	4.25	5.00	6.50	10.00 each.



3040



3045



3053



3059

3040.—Ditto, copper, loose heads, ground and fastened with clamp, for making oxygen. 1 qt., \$4.50 2 qts., 6.00 each.

3041.—Ditto lead, for making hydrofluoric acid. Each, \$5 to 25.00

3042.—Ditto, platinum, according to size.

Per gramme, .40 to .45

Ditto, holders. See Supports.

Revolving Electro-Magnet. See Magnet.

3043.—Riders, of aluminum. Each, .75

Ring Burners, various kinds. See Burners.

3044.—Rings, concentric, sets of 7. .80

Ditto, of straw. See Straw Rings.

3045.—Roasting Dishes, according to size. Per 100, \$7.50 to 10.50

3046.—Roasts, Plattner's, used in quantitative analysis of metallic ores before the blow-pipe. Each, \$2.00

3047.—Roasting Charcoal, pieces. Per doz., .75

3048.—Roasting Charcoal, forms for making, complete.

Per doz., \$3.75

3049.—Rods, of glass, for electric excitation.

Each, 1.00

3050.—Ditto, ditto, ordinary, assorted sizes.

Per lb., .60

3051.—Ditto, ditto, extra large, Bohemian, or French, assorted sizes

Per lb., \$1.00

Ditto, ditto, stirring. See Stoppers.

3052.—Rod of Shellac, for resin excitation.

2.00

3053.—Rubber Balls. Small, \$5.00 large, 6.50 Per doz.,

3054.—Rubber Finger Tips, for protecting fingers in handling acids and poisonous substances in the laboratory and in the dissecting room; thin, and of the very best quality. Each, .10

3055.—Rubber, sheet, French, thin.

No. 8, .50

No. 11, .60 per oz.

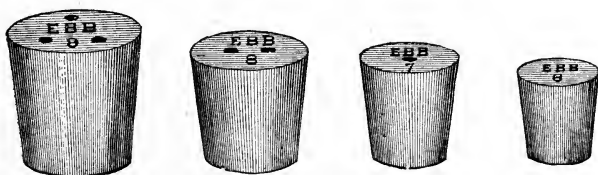
3056.—Ditto, stoppers, American, solid.

Nos. 5½	5	4	3	2½	2	1
\$1.50	1.50	2.25	3.75	5.00	6.00	9.00 per 100.

3057.—Ditto, ditto, of best French, flexible unvulcanized gum, each cork accurately conical and perfectly smooth, cast in my own moulds, solid, 1, 2, and 3 holes.

Nos. 1	2	3	4	5	6	7	8	9	10	11	12
.08	.09	.10	.15	.20	.25	.30	.35	.50	.60	.65	.75 each.

Or \$9.00 per lb.



3057

No. 9,	1½	x	1½	x	1½
" 8,	1¼	x	1¼	x	1¼
" 7,	1⅓	x	1⅓	x	1⅓
" 6,	1⅒	x	1⅒	x	1⅒

Other numbers, sizes in proportion to above.

3058.—Ditto, ditto, ditto, in the form of Whipstock, to cut off, as required.

Each, \$10.00

3059.—Ditto, Syphon Primers. See Rubber Tubing. " 1.50

3060.—Ditto, Urinals. " 1.00

3061.—Rupert Drops. Per doz., .50



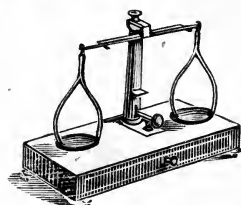
3062



3082



3066



3075



3069



3079



3084

3062.—Russian Spirit Lamps.

Each, \$2.00

Saccharimeters. See Polarization.**Saccharometers.** See Hydrometry.**Safety Funnels.** See Funnel Tubes.**Ditto, Lamps.** See Davy's.**3063.—Salometers.**

" 1.25

3064.—Sand Baths, cast iron, with handles $8\frac{1}{2}$ to 9 in.

" 2.25

3065.—Ditto, ditto, spun, best, French, deep, very stout.

4	5	6	7 in.
.40	.50	.60	.75 each.

3066.—Ditto, ditto, shallow.

2	3	4	5	6 in.
.20	.25	.30	.35	.40 each.

3067.—Ditto, ditto, copper, 3, 4, 5, and 6 inches. Per inch, .10**3068.—Ditto, Glasses,** for mariners, wood.

15 seconds, \$1.25 30 seconds, 1.50

3069.—Ditto, ditto, small, of wood, 3, 5, 10 minutes. Each, .50**3070.—Ditto,** ditto, of brass, small, 5 minutes. " .75**3071.—Saw,** small, with cocoa handle. .75**3072.—Scales,** apothecaries, with brass beams and horn pans, without pedestal.

4	$4\frac{1}{2}$	5	6	7	8 in. beam.
\$1.40	1.50	1.85	2.10	3.00	4.00 each.

3073.—Ditto, ditto, with brass pans.

4	5	6 in. beam.
\$1.00	1.25	1.50 each.

3074.—Ditto, ivory, for measuring the button in assay accurately.

Each, \$5.00

3075.—Ditto, prescription, various.

5.00 to 20.00

3076.—Ditto, small, in tin boxes, with weights.

Each, 1.25

3077.—Scales, prescription, in morocco cases. Each, \$1.25

3078.—Scale Pans, of horn, adjusted with silk cord.

Nos.	1	2	3	4	5	6	7	8	9
Diam.,	1 $\frac{3}{4}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{4}$	4 $\frac{1}{2}$	5 $\frac{1}{4}$ in.
Price,	.40	.50	.65	.75	.90	\$1.25	1.45	1.75	2.00 each.

See also Balances, page 17.

3079.—Schuster's Dropping Flasks, stoppered. Each, .25

3080.—Scissors. Each, .50 to \$1.00

3081.—Ditto, tinsmiths', for cutting metals. " 2.50

3082.—Scoops, of horn. " .12

3083.—Scorifiers, Freiburg usual form. Per 100, 3.50

3084.—Ditto, ditto, urn shape. " 20.00

3085.—Ditto, holders, of iron, with 9 partitions, for holding scorifiers, when various assays are under examination together.

Each, \$1.50

3086.—Scorifying Moulds, of cast iron, with 9 small round cavities

Each, \$1.00

Scorifier Moulds. See Moulds.

Ditto, Tongs. See Tongs.

3087.—Scratch Brushes, or Button Brushes, for use in assay, of hard bristles.



3086



3091

Each, .50

3088.—Ditto, Brush Wire, Per lb., \$5.00

3089.—Screen, of iron wire, to surround the Bunsen or spirit lamp, when burning under a tripod, to protect the flame from currents of air.

Each, \$1.00

3090.—Screws, brass head. " .10

3091.—Seidlitz Powder Cups, with partitions. " .60

Sets of chemical apparatus for beginners. See the back of the book.

Separatory Bottles. See Bottles.

Ditto, Funnels. See Funnels.

3092.—Shades, Lilly, for covering rare objects. Each, \$2 to 15.00

3093.—Sharpeners, for knives. " .50

3094.—Sieves, brass, 10, 20, 30, 40, 50, 60, 80, 100 meshes to the inch; 5 inches. Each, .50 to \$1.25

3095.—Ditto, ditto, ditto, 7 inches. " .75 to 1.50

3096.—Ditto, ditto, ditto, 12 " " 1.00 to 2.00

3097.—Ditto, horse hair. " 1.25

3098.—Sieves, silk bolting cloth, small, French.

3	4	5	6 in.
.50	.75	\$1.00	1.50 each.

3099.—Ditto, box, Griffin's, with two partitions. Each, \$2.50

3100.—Ditto, Plattner's, for use before the blow-pipe. " .50

3101.—Silver, pure, for mineral tests. Per ounce, 3.00

3102.—Skins, Cat, for electrical excitation purposes. Each, 1.25

3103.—Ditto, Chamois, for handling brass apparatus. " .75

3104.—Slips, of glass, with edges carefully ground, to prevent cutting the hand, for the testing of small quantities of liquid in quantitative analysis; also convenient for color test, 1x3 in.

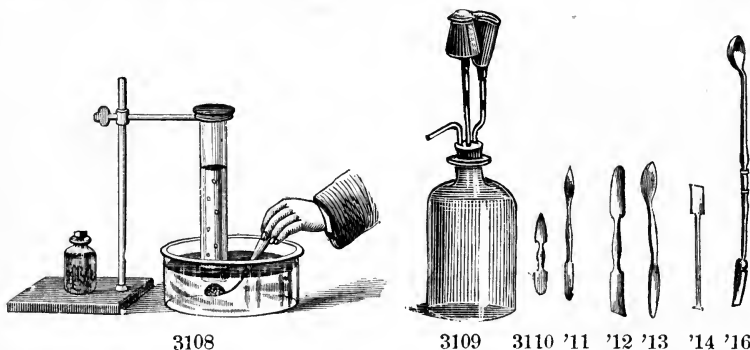
Per doz., .75

3105.—Ditto, of unglazed porcelain, to try streak or color of minerals. Per doz., .75 to \$1.00

Smelling Bottles. See Pungents.

3106.—Soda Paper, for preparing cartridges in blow-piping. .50

3107.—Soda Water, apparatus for making. \$7.50



3108.—Sodium Spoon, for holding sodium in water under cylinder. .50

3109.—Ditto, Flame, apparatus for inverting. \$3.50

Soufflets, cylindric, or glass-blowing table. See Glass blowers' table.

3110.—Spatulas, bone, with pointed handle.

4½ in., .20

5 in., .25 each.

3111.—Ditto, with spoon.

4
.20

5½
.25

6 in.
.30 each.

3112.—Ditto, bone, with double end.

Each, .25

3113.—Ditto, and spoon, ivory, assorted, small.

" .15

3114.—Spatulas, of glass, 6 inches. Each, .15

3115.—Ditto, of brass, double end, 4 inches. “ .75

3116.—Ditto, and spoon, of brass, adapted for weighing small quantities. \$1.25

3117.—Ditto, of horn.

$2\frac{1}{2}$	4	5	6	7	$7\frac{1}{2}$	8 in.
.10	.15	.20	.25	.30	.35	.40 each.

3118.—Ditto, ditto, with spoon.

3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	7	8 in.
.15	.18	.20	.23	.25	.28	.35	.40	.50 each.

3119.—Ditto, platinum. Per grain, .3



3120



3121



3122



3123



3126



3128

3120.—Ditto, porcelain, with handle.

$4\frac{1}{2}$	$5\frac{1}{4}$	$6\frac{1}{2}$	$7\frac{1}{2}$	$8\frac{1}{2}$ in.
.40	.45	.50	.65	.70 each.

3121.—Ditto, ditto, square end.

$11\frac{1}{2}$	$14\frac{1}{2}$	$17\frac{1}{2}$ in.
.75	.90	\$1.25 each.

3122.—Ditto, ditto, double.

$11\frac{1}{2}$	$14\frac{3}{4}$	17 in.
.50	.60	.90 each.

3123.—Ditto, ditto, with spoon.

11	$14\frac{1}{2}$	17 in.
.55	.70	\$1.00 each.

3124.—Ditto, steel, double ends.

Each, .25 to .75

3125.—Ditto, ditto, cocoa handle, length of blade—

3	4	5	6	7	8	9	10 in.
.25	.30	.35	.40	.50	.60	.80	\$1.00 each.

3126.—Specific Gravity Bottles, plain, solid stopper, cut glass.

100	500	1000 grs.
\$1.00	1.75	2.50 each.

3127.—Ditto ditto, ditto, ditto.

10	25	50	100 grams.
\$1.25	1.50	1.75	2.00 each.

3128.—Specific Gravity Bottles, perforated stopper, light blown glass.

100	250	500	1000 grs.
.75	\$1.00	1.50	2.00 each.

3129.—Ditto, ditto, ditto, ditto, in fine chamois-lined leather cases, with counterpoise.

100	250	500	1000 grs.
\$2.50	3.00	4.00	5.00 each.

3130.—Ditto, ditto, ditto, ditto.

10	25	50 gram's.
\$2.50	3.50	4.00 each.

3131.—Ditto, ditto, ditto, ditto, in case, with fine chamois-lined leather case, of cut glass, with solid stopper.

25 grams.	\$4.00	100 grams.	7.50 each.
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3132.—Ditto, ditto, ditto, ditto.

100	500	1000 grs.
\$3.50	4.00	4.50 each.

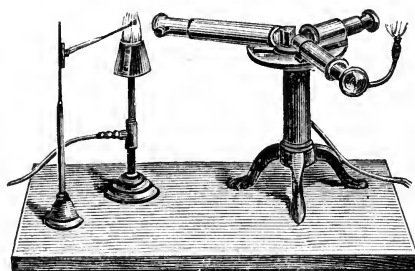
3133.—Ditto, ditto, ditto, with thermometer. 50 grm's, 3.50

3134.—Ditto, ditto, **Flasks**, round, stoppered, 1000 grs. Ea. \$2.00

3135.—Ditto, ditto, ditto, not stoppered, 1000 " " .75

3136.—Spectroscopes, Browning's, for direct vision, with five prisms. Each, \$15.00

3137.—Ditto, ditto, with cover, larger. " 18.00



3143

3138



3147

3152

3138.—Ditto, ditto, "Heidelberg laboratory," single prism, with 2 lamps, millimeter scale, 2 stands, 3 scales on drawing paper, 1 small chart and an assortment of platinum holders for the salts, complete. Each, \$65.00

3139.—Ditto, Browning's elegant "model," two prisms, in a highly polished mahogany case, with lock and key, and handle to carry it, having a swivel arrangement for the telescope, so that the

spectrum may be extended and clearly defined, with tangent screw motion. It will widely separate the D lines. Ea. \$160.00

3140.—**Spectroscopes**, larger; imported only on special order.

Spectroscopic Charts. See Charts.

3141.—**Ditto, Lamps**, for evaporating metallic substances. Ea. \$3.50

3142.—**Ditto, Stand**, for holding salts in lamp flame. “ 1.50

3143.—**Ditto, Lamp and Stand** together. “ 4.75

3143A.—**Ditto, ditto**, for alcohol. “ 2.50

Ditto, Support. See Supports.

3144.—**Spectrum**, Browning's lantern arranged for showing on screen, small size. \$50.00

3145.—**Ditto**, large size, complete. 150.00

Spirit Lamps. See Lamps.

3146.—**Spiral**, or Spotted Tube. \$3.00 to 5.00

3147.—**Spoons**, Blow-pipe, of iron. Each, .25 to .50

3148.—**Spoons**, bone.

$2\frac{1}{2}$	5	6 in.
.10	.20	.25 each.

3149.—**Ditto**, brass, turned, for weighing powders. Each, \$1.25

3150.—**Ditto**, tea, of glass. Per doz., 1.50

3151.—**Ditto**, dessert, of glass. Each, .40

3152.—**Ditto**, table, “ “ .50

3153.—**Ditto**, dipping, ladle form, of glass. “ 1.00

3154.—**Ditto**, horn, first quality.

3	6	7	8	9 in.
.18	.25	.30	.35	.50 each.

3155.—**Ditto**, horn, ordinary.

5	$5\frac{1}{2}$	7	$7\frac{1}{2}$	8 in.
.15	.18	.20	.25	.30 each.

And wide bowl, $7\frac{1}{2}$ in., .40.

3156.—**Ditto**, iron.

Each, .40

3157.—**Ditto**, porcelain.

$5\frac{3}{4}$	7	9	$9\frac{1}{4}$	$13\frac{1}{2}$ in.
.30	.50	.60	.75	\$1.50 each.

3158.—**Ditto**, tea, porcelain.

Per doz., \$3.00

3159.—**Ditto**, ditto, ditto, perforated, for dipping crystals or leeches, oval.

Each, .50

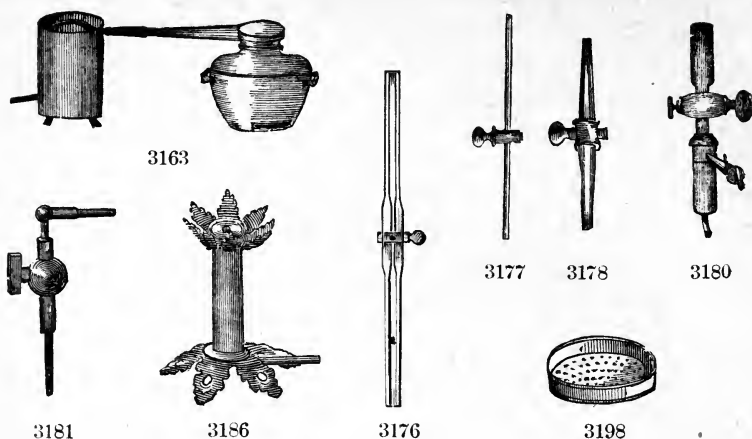
3160.—**Ditto**, ditto, ditto, ditto, round.

“ .60 3160

3161.—**Sticks**, of prepared coal, for breaking glass. Per doz., .60

3162.—**Ditto**, ditto, ditto, ditto, larger. “ .70





3163.—Stills, of copper, with worm, tinned.

1	2	3 galls.
\$12.00	15.00	20.00 each.

3164.—Stirrers, of glass, ends polished.

6	9	12 in.
.30	.45	.60 per doz.

3165.—Stool, insulating.

\$5.00

3166.—Stop Cocks, of brass, mounted on foot, with double ends,
for tubing, with screw knobs, for securing to table. Each, \$1.50

3167.—Ditto, ordinary. " 1.25

3168.—Ditto, with double ends, for tubing. " 1.25

3169.—Ditto, one end for tubing, 1 male screw. " 1.25

3170.—Ditto, double male screw. " 1.25

3171.—Ditto, ditto, female " " 1.25

3172.—Ditto, male and female screw. " 1.25

3173.—Ditto, brass, one end for tubing and one for inhaling. Ea. 1.00

3174.—Ditto, earthenware, English.

4½ in. long, \$3.00	9½ in. long, 4.50 each.
---------------------	-------------------------

3175.—Ditto, ditto, French.

7½	9	10	12	15 in.
\$2.50	3.00	4.00	5.00	6.00 each.

3176.—Ditto, glass, for vinegar and acids, small. Each, 1.25

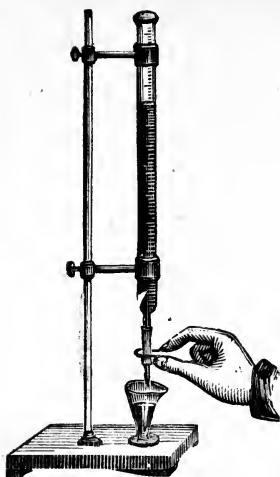
3177.—Ditto, ditto, Geissler's, of glass, for connections. " 1.50

3178.—Ditto, ditto, heavy. " 1.50

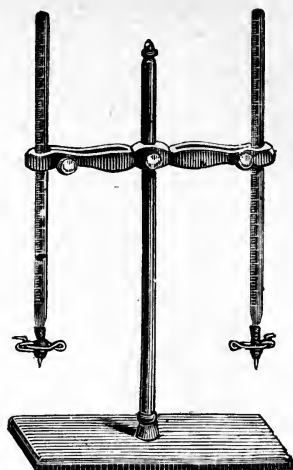
3179.—Ditto, for gas generators. " 1.25

3180.—Ditto, Deleuil, of silver, for assay, by the wet way. " 30.00

- 3181.—**Stop Cocks**, brass, for Marsh's arsenic test. Each, \$1.50
- 3182.—Ditto, one end bent and the other end ground, for fitting tubulatures, of glass. Each, \$1.25
- 3183.—Ditto, of glass, one end enlarged to receive a cork. " 1.25
- Stoppers**, caoutchouc. See Rubber.
- 3184.—**Storm Glasses**, plain. " 1.00
- 3185.—Ditto, with thermometer. " 2.50
- 3186.—**Stoves**, gas, small vulcan. " .75
- 3186A.—Ditto, ditto, larger.
- | | | |
|--------|------|------------|
| Nos. 1 | 2 | 3 |
| \$1.25 | 1.50 | 1.75 each. |
- 3187.—Ditto, Kerosene. No. 3, \$5.00 No. 4, 6.00 each.
- 3188.—Ditto, ditto, with boiler, for heating purposes. Each, \$4.50
- 3189.—**Straining Baskets**, porcelain, with handle on the side. Each, \$3.25
- 3190.—Ditto, with handle on the top, shallow. " 3.00
- 3191.—Ditto, ditto, deep. " 3.50
- 3192.—Ditto, earthenware, with handle on the side. Each, \$2.00 to 3.00
- 3193.—Ditto, with handle on top. " 2.50 to 3.50
- 3194.—**Straining Dishes**, porcelain, perforated for crystals, flat bottom.
- | | | | |
|-----|--------|------|------------|
| 7 | 9 | 10½ | 12 ins. |
| .75 | \$1.00 | 1.25 | 1.50 each. |
- 3195.—Ditto, porcelain, round bottom, large size, glazed inside and out.
- | | |
|----------------|-----------------------|
| 13 in., \$3.50 | 15½ in., \$4.50 each. |
|----------------|-----------------------|
- 3196.—Ditto, porcelain, with handle on each side, holes small, 6 in. diameter. Each, \$1.00
- 3197.—Ditto, porcelain, small hemispherical, with handle on one side.
- | | |
|---------------|------------------|
| No. 1, \$1.25 | No. 2, .75 each. |
|---------------|------------------|
- 3198.—Ditto, **Plates**, French, with rim around the top.
- | | | |
|-----|-----|--------|
| 20 | 25 | 30 cc. |
| .35 | .40 | .50 |
- 3199.—**Straw Rings**, French plaited, for supporting round bottom vessels, dishes, flasks, retorts,
- | | | | | | |
|-----|-----|-----|-----|-----|-----------|
| 3 | 3½ | 4¼ | 5½ | 7 | 9 in. |
| .18 | .20 | .22 | .27 | .35 | .40 each. |
- Suction Tubes**, for filling bulbs, etc., see Filling Tubes.
- 3200.—**Supports**, for potash bulbs, with hooks. Each, \$1.50



3202

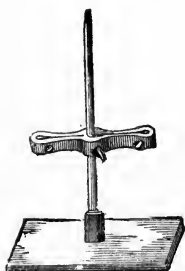


3204

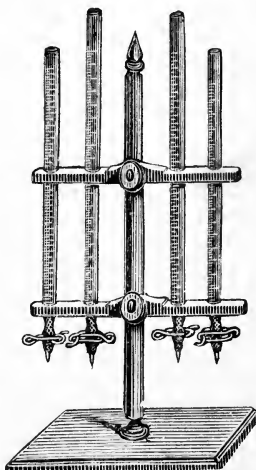
3201.—Supports, for objects in lamp flame. Each, \$1.50

3202.—Ditto, for burettes, of brass, of light iron base, and clamps with cork lining for two burettes. Each, 3.50

3203.—Ditto, of brass, new style, with porcelain foot for two burettes, for micro-chemical purposes, the holders shaped to the burette, and nicely cork lined. Each, \$5.00



3206



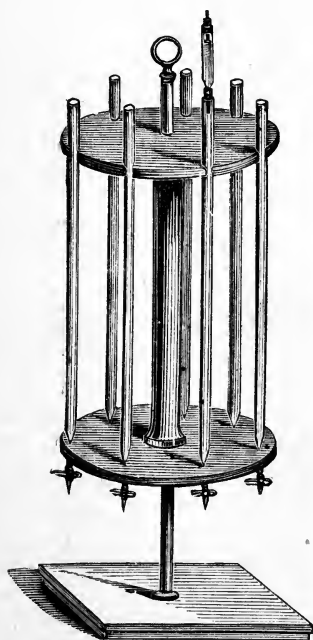
3207



3208

3204.—Ditto, of brass, for two burettes, spring clamp, with cork lining, and fine oiled black walnut foot. \$4.00

- 3205.—Supports**, of iron, for two burettes, cork lined clamps
Each, \$3.50
- 3206.—Ditto**, ditto, of soft wood, with cork lined jaws, for
1 \$1.25 2 burettes, \$1.50
- 3207.—Ditto**, ditto, with round wooden foot, with clamps, hinged
and cork lined, for
4 \$3.50 6 burettes, \$5.00.
- 3208.—Ditto**, ditto, revolving, of highly polished pear wood, for
5 8 12 burettes,
\$4.50 5.00 6.00 each.
- 3209.—Ditto**, for burettes, revolving, japanned tin, with base and
staff, of walnut. 8 burettes, 4.00 each.



3210

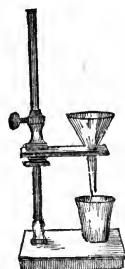
- 3210.—Ditto**, ditto, pear wood,
staff, 6 8
\$5.00 6.00



3212



3213



3216



3215



3218

- 3211.—Support**, Hoffman's, new, with four Bunsen's burners, of
highly polished brass. \$8.00

3212.—Support, Mischterlich's, for the examination of fluids under the spectroscope. \$7.50

3213.—Ditto, earthen, for crucibles, or "*fromages*." .20

3214.—Ditto, porcelain, for small dishes. .25

3215.—Ditto, Table, including fork and drying tripod.

6	9	12	13½ in. high.
.75	\$1.00	1.25	1.50 each.

3216.—Supports, or Filter Stands, for single funnel. Each, \$1.00

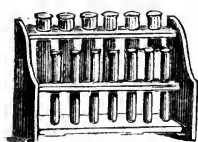
3217.—Ditto, or ditto, for two funnels, single arm. " 1.25

3218.—Ditto, ditto, for six funnels and double arm. " 1.25

3219.—Ditto, or Filtering Stands, to cover beaker, according to Fresenius. Each, \$1.25

3220.—Ditto, with large wooden ring. " 1.50

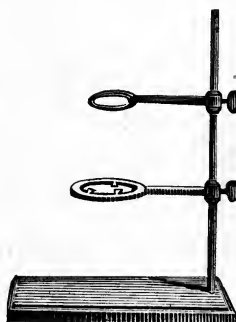
3221.—Ditto, with two wooden rings. " 1.50



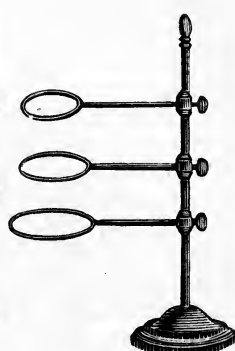
3226



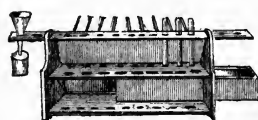
3227



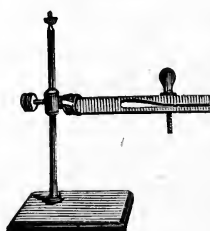
3233



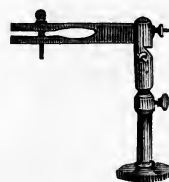
3234



3229



2236



3237

3222.—Ditto, of iron, with triangular base arranged for holding spirit lamp. Each, \$1.50

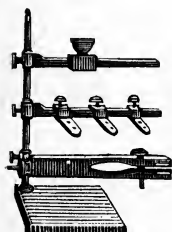
3223.—Ditto, Hoffman's, with wood-lined rings. " 2.75

3224.—Ditto, wood, for sustaining tubes and connecting apparatus, black varnished wood, Griffin's form, 314. Each, \$1.75

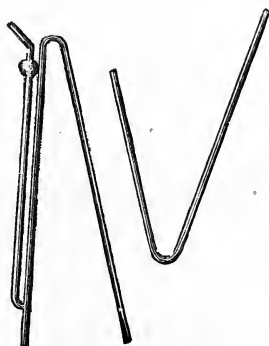
3225.—Ditto, ditto, ditto, ditto, mahogany. " 2.00

3226.—Ditto, Test tubes, for 13 tubes. " .75

- 3227.—Supports,** Test tubes, polished mahogany, with pins, for draining. Each, \$1.50
- 3228.—Ditto, ditto,** for 18 tubes. “ 1.00
- 3229.—Ditto, ditto,** mahogany, with drawer and draining pins. Each, \$2.00
- 3230.—Ditto, ditto,** universal, circular. “ 2.00
- 3231.—Ditto, ditto,** japanned tin, for six test tubes, Each, .60
- 3232.—Ditto,** for retorts, wire, two rings. “ .90
- 3233.—Ditto,** ditto, iron, “ \$1.00
- 3234.—Ditto,** ditto, “ three rings. “ 1.25
- 3235.—Ditto,** ditto, brass, “ with porcelain foot. “ 4.50
- 3236.—Ditto,** ditto, of wood, Gay Lussac form. “ 1.25
- 3237.—Ditto,** ditto, “ Shellbach, round iron base, two joints and sliding clamp. Each, \$2.00
- 3238.—Ditto,** ditto, iron base, two joints and sliding clamps, polished. Each, \$2.50
- 3239.—Ditto,** ditto, French, upright. “ 1.50



3240



3247



3250

- 3240.—Ditto,** ditto, universal. “ 2.00
- 3241.—Ditto,** ditto, “ fine quality, heavy. “ 3.50
- 3242.—Ditto,** ditto, “ highly polished, pear wood. “ 4.00
- 3243.—Ditto,** feet of porcelain, round. “ .50
- 3244.—Ditto,** japanned, for flasks in Bunsen's quick filtering apparatus. Each, \$3.50

Supports, other forms made to order.

- 3245.—Stand,** of iron, with polished fork, Hoffman's. “ 1.50
- 3246.—Ditto,** “ wood, with fork, small. “ .75

Swimmers. See Burette Swimmers.

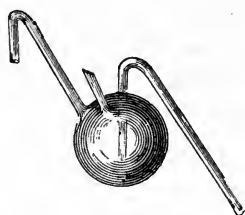
3247.—Siphon, glass, plain. 12 in., .25 15 in., .30 each.
Ditto, Acid. See Acid Syphons.

3248.—Ditto, pipette, glass, new style, various. Each, .75

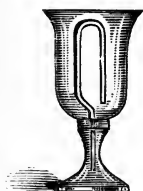
3249.—Syringes, glass. Each, .50 to \$1.50



3248



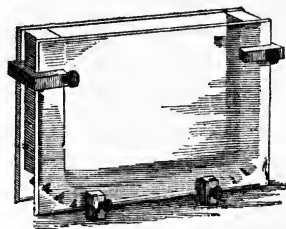
3248



3254



3262



3253

3250.—Ditto, metallic, male, in mahogany cases. Each, \$4.00

3251.—Ditto, male and female, “ “ 5.00

3252.—Ditto, Fire, of glass. “ 6.00

Ditto, brass. See Air Pumps.

3253.—Tank, for holding solutions when under examination by the Lantern; consists of two glass plates, separated by rubber partition which forms the wall of the tank, on three sides. \$3.50

3254.—Tantalus Cup. 2.00

3255.—Tapers, wax, in small boxes. Per box, .25

3256.—Ditto, ditto, to burn in oxygen, etc. Per pair, .20

3257.—Telescope, with mounting support, on legs, made by the celebrated Merz, of Munich, in leather case, achromatic, power 50 times. \$30.00

3258.—Telegraph, working model, with reel. 8.00

Telegraphic Apparatus, other, special to order.

3259.—Tellurian, for showing the phenomena of the seasons. \$13.00

Test Chests. See Reagent chests.

Tests, blow-pipe cases. See Blow-pipe Cases, etc., at the end of the book.

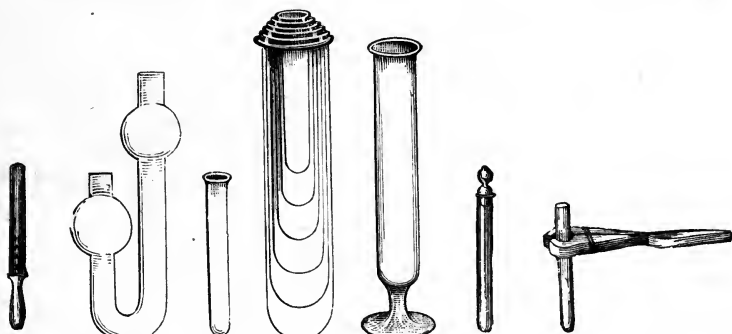
3260.—Test Dishes, porcelain, for colored precipitates. Each, .25

3261.—Ditto, Glasses, conical, on foot, without lip. “ .40

3262.—Ditto, ditto, French, ditto, ditto, with lip.

$\frac{1}{2}$	1	2	4	8	16 oz.
.15	.18	.25	.30	.40	.50 each.

3263.—Ditto, ditto, micro-chemical, of thin glass, very small, made by blow-pipe. Per doz., \$1.75



3264

3266

3269

3271

3272

3273

3274

3264.—Test Lead Measure, Plattner's. Each, .50

3265.—Ditto, ditto, Sieve, brass, Plattner's. “ .50

Test Metals. See Minerals, at the back part of this book.

3266.—Test, Marsh's, arsenic. 75

3267.—Test Papers, assorted. Per sheet, .5

3268.—Test Tubes, infusible Bohemian glass, 6 x $\frac{3}{4}$ in. Per doz., \$1.25

3269.—Ditto, French and German, with the ends even thickness throughout; free from lead.

3	4	5	6	7	9	10 in. long.
$\frac{3}{16}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{2}$	$\frac{1}{2}$ to $\frac{5}{8}$	$\frac{5}{8}$ to $\frac{3}{4}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$ in. wide about.
.30	.40	.50	.60	.75	\$1.50	2.25 per doz.

Each one of the above Test Tubes is carefully wrapped in paper, to keep them from chemical contact, and to preserve the lips from breakage. The diameters are averaged.

3270.—Ditto, in nests of

3	6	9	16
.20	.30	.50	.70 each.

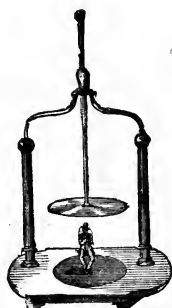
3271.—Ditto, with pasteboard cases, in nests of

6	9
.40	.60 each.

3272.—Ditto, on foot.

$1\frac{1}{2}$	2	4	6	8 in.
.40	.45	.60	\$1.00	1.25 per doz.

- 3273.—Test Tubes**, stoppered, 5 in. Per doz., \$1.25
Test Tube Brushes. See Brushes.
3274.—Ditto, Holders, wood, new form. Each, .20
3275.—Ditto, ditto, brass, with sliding band. “ .50
3276.—Ditto, ditto, “ “ wood handle. “ .60
3277.—Ditto, ditto, wire, with wood handle. “ .50
Ditto, ditto, and supports. See Supports.
3278.—Testing Slab, plain, of porcelain. “ .50



3279



3281

- 3279.—Theatre Pantin**, with glass pillars, for dancing figures. \$15.00
3280.—Thermo Electric, pair of bismuth and antimony. \$2.00
3281.—Ditto, ditto, Pile. Each, \$30.00 to \$35.00
3282.—Thermometers, Axillary. 6 in., \$2.00 7 in., \$3.00 each.
3283.—Ditto, Beer, accurately registered, Fahrenheit and Centigrade. Each, \$2.00
3284.—Ditto, chemical, 8 in. long, up to 212 deg. Fah., paper scale in glass tube, and pasteboard cases. Each, .85
3285.—Ditto, ditto, ditto, ditto, 10 in. long. “ .90
3286.—Ditto, ditto, ditto, ditto, 12 “ “ \$1.00
3287.—Ditto, ditto, ditto, ditto, 15 “ “ 1.20
3288.—Ditto, ditto, ditto, ditto, up to 260 deg.
12 in. long, \$1.25 15 in. long, 1.25 each.
The largest thermometers are smallest in diameter.
3289.—Ditto, ditto, Celsius paper scale, 50 to 100 deg. Each, 1.50
3290.—Ditto, ditto, Celsius, or Centigrade, up to 350 or 410 deg. Each, \$2.00

- 3291.—Thermometers**, Chemical, Milk scale, Fah., enclosed in glass tube, graduated up to 212 deg. Each, \$1.50
- 3292.—**Ditto, ditto, ditto, ditto, running from 280 to 330 deg. Each, \$1.75
- 3293.—**Ditto, ditto, ditto, ditto, running from 400 to 640 deg. Each, \$2.00
- 3294.—**Ditto, ditto, ditto, ditto, running up to 660 and 800 deg. Each, \$2.25
- 3295.—**Ditto, ditto, ditto, Fah. and Reamur, up to 700 deg. “ 3.00
- 3296.—**Ditto, ditto, ditto, engraved on the tube, Centigrade or Celsius, up to 100 deg. Each, \$2.25
- 3297.—**Ditto, ditto, ditto, up to 200 deg. “ 2.50
- 3298.—**Ditto, ditto, ditto, up to 360 “ “ 3.00
- 3299.—**Ditto, ditto, ditto, Fah., up to 200 deg. “ 2.25
- 3300.—**Ditto, ditto, ditto, ditto, “ 400 “ “ 2.50
- 3301.—**Ditto, ditto, ditto, ditto, “ 600 “ “ 3.00
- 3302.—**Ditto, ditto, ditto, ditto, above. “ 3.50
- 3303.—**Ditto, ditto, ditto, ditto, double scale, large, with brass top Fahrenheit, 300. Each, \$3.00
- 3304.—**Ditto, Differential, Leslie's. \$2.50 to 4.00
- 3305.—**Ditto, ditto, ditto, having two limbs, joined with tightly fitting ground glass stop-cock. Each, \$4.00
- 3306.—**Ditto, Day and Night, glass. “ 4.00
- 3307.—**Ditto, House, in mahogany, Fahrenheit and Centigrade, French spirit. Each, .40
- 3308.—**Ditto, ditto, ditto, japanned tin, Fahrenheit.
- | | | |
|-----|-----|--------------|
| 6 | 9 | 12 in. |
| .50 | .75 | \$1.00 each. |
- 3309.—**Ditto, Medical, for ascertaining heat of the human body, during fever or otherwise. Each, \$5.00
- 3310.—**Ditto, Metallic, watch form, silver case. “ 20.00
- 3311.—**Ditto, ditto, revolving, for pocket, Fahrenheit and Centigrade, German silver case. Each, \$10.00
- 3312.—**Ditto, Sugar-house, French, accurately graduated, Fahrenheit and Centigrade. Each, \$10.00
- 3313.—**Ditto, **Window**, Milk glass, silvered, etc., Fahrenheit, Celsius, and Reamur. Each, \$1.00 to \$5.00
- 3314.—Thermometer Tubes.** Each, .25
- 3315.—Thieves**, for drawing or decanting spirits, glass. “ .75

3316.—Thunder House, mahogany. Each, \$8.00

3317.—Tin Foil, for blow-pipe experiments. Per square foot, .15

3318.—Tissue Figure. \$1.50



3319



3320



3322



3323

3319.—Tongs, coal.

13
\$1.25

14
1.50

17½ in.
1.75 each.

3320.—Ditto, ditto, ditto, heavy, with twine wound handles to protect the hands from frost in cold weather. Each, \$1.00

3321.—Ditto, crucible, 6 in. japanned iron. “ .50

3322.—Ditto, ditto, single bend steel, 9 in. “ 1.00

3323.—Ditto, ditto, double bend. “ 1.25

3324.—Ditto, ditto, ditto, German silver. “ 1.50

3325.—Ditto, ditto, ditto, nickleized. “ 2.25

3326.—Ditto, ditto, steel, with heavy platinum points, double bend. Each, \$6.00

3327.—Ditto, ditto, German silver, with heavy platinum points, double bend. Each, \$6.50

3328.—Ditto, ditto, steel, with large double bend. “ 1.50

3329.—Ditto, wrought iron, for sand crucibles, with ditto. “ 1.75

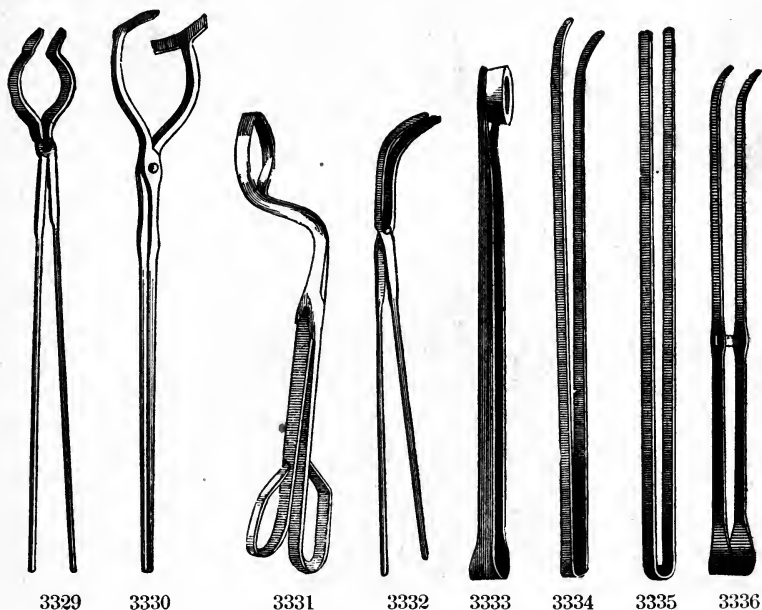
3330.—Ditto, for lifting crucibles vertically, extra heavy. “ 2.00

3331.—Ditto, ditto, French, double bend, 14 to 18 inches long. Each, \$1.50

3332.—Ditto, ditto, wrought iron, single bend, heavy, for handling sand crucibles. Each, \$1.00 to \$1.25

3333.—Ditto, cupel. bent in the ends, of steel, to surround the cupel. Each, \$1.50

- 3334.**—Tongs, cupel, of galvanized iron, single bend. Each, \$1.50
3335.—Ditto, ditto, straight. “ 1.50
3336.—Ditto, ditto, French, bent on the end, with strap “ 2.75



- 3337.**—Ditto, Scorifier, one limb to fit around the scorifier, and one to fit over it, so that it can be moved in and out of the cupelle furnace very steadily. Each, \$1.25

Tools for Blow-piping, in chests. See Blow-pipe Apparatus at the close of the book.

- 3338.**—Torricellian Experiment. \$4.50

- 3339.**—Touries, or Carboys, with 2 necks and tubulature near the foot, of French earthenware, for the distillation of acids, etc.
 60 litres, \$12.00 100 litres, 15.00 each.

- 3340.**—Ditto, connecting pipe, for above. Each, \$1.50

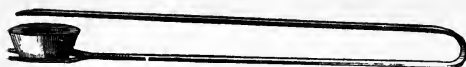
- 3341.**—Ditto, of German stoneware, glazed outside, 200 litres.
 Each, \$50.00

- 3342.**—Ditto, stoneware connections, for ditto. “ 5.00

- 3343.**—Ditto, set of 2, with connecting pipe. “ 1.00

- 3344.**—Trays, lead. Each, .50

- 3345.**—Ditto, shallow porcelain, for holding jars containing corrosive liquids. Each, .20 to .40



3337



3350



3339



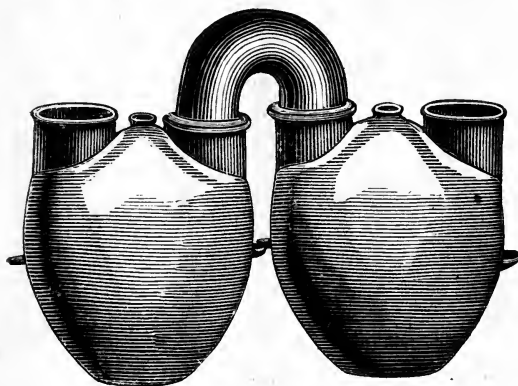
3352



3353



3356



3343



3360

- 3346.—Trays, walnut, with partitions, for batteries. Each, \$1.50
 3347.—Trellis Top, for furnace, of gauze wire. “ 1.50
 3348.—Triangles, of glass. “ .30
 3349.—Ditto, Plattner's Blow-pipe. .25
 3350.—Ditto, ditto, porcelain. “ .50
 3351.—Ditto, ditto, wire. Per doz., .60

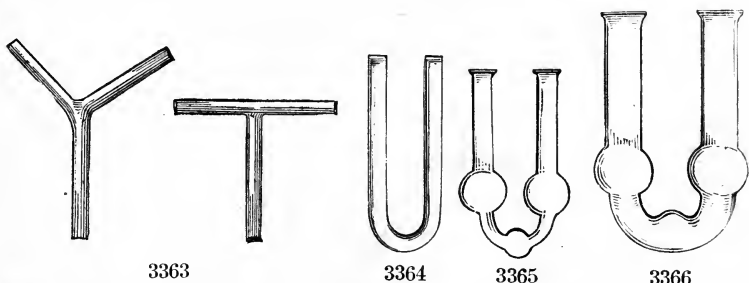
Trimming Hammers. See Hammers.

- 3352.—Tripods, of galvanized iron, for gas burner. “ \$7.00
 3353.—Ditto, ditto, brass, for spirit lamp. “ 9.00
 3354.—Ditto, of wrought iron, with two concentric rings. Ea., 1.00
 3355.—Ditto, ditto, ditto, with 7 concentric rings. “ 2.00
 3356.—Ditto, of iron, triangular shape, sets of three. 1.75
 3357.—Ditto, ditto, singly.

Smallest, .50 Medium, .60 Largest, .75 each.

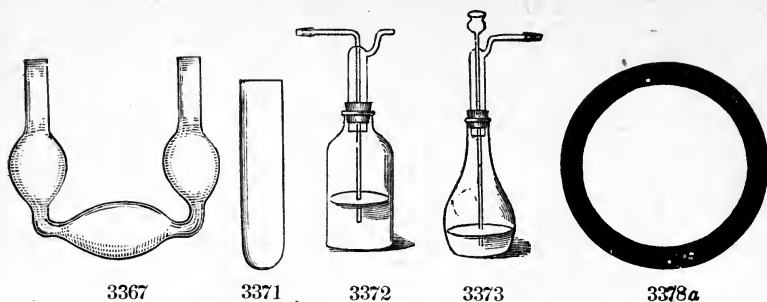
Tubes, Arsenic, Chloride of Calcium, Combustion, Condensing, Communicative, Gas, etc. See respective heads.

- Tubes**, delivery. Per doz., \$1.50
 Ditto, drying. Each, .50
 Ditto, filling. " .50
 Ditto, julep. Per doz., .50
 Ditto, for Liebig's condenser, ordinary size. Each, \$1.00
 Ditto, ditto, ditto, 6 ft. " 3.00
3358.—Ditto, for musical sounds. " .50
3359.—Ditto, containing phosphorescent substances, in cases, \$3.00
 and in frames, \$5.00.
3360.—Ditto, sealing, for receiving substances, the neck being
 afterwards closed by lamp flame. Per doz., \$2.00
3361.—Ditto, spiral electric. Each, 3.00
3362.—Ditto, T large, of thermometer tubing. " 1.00

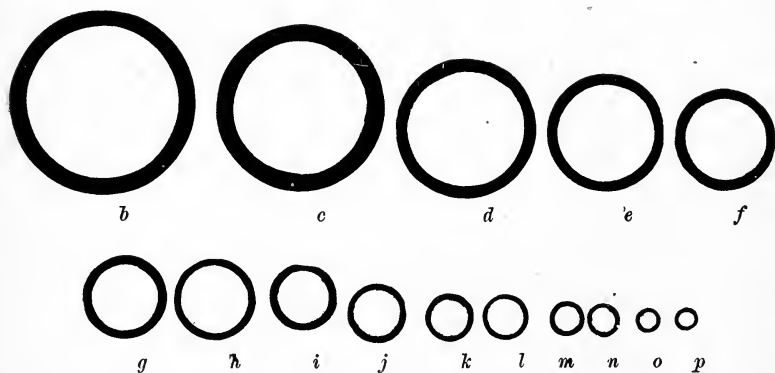


- 3363.**—Ditto, 3 way, small, made of ordinary glass. Each, .25
3364.—Ditto, U,
 6 9 10 in.
 .25 .50 .60 each.
3365.—Ditto, ditto, 3 bulbs, small. " .40
3366.—Ditto, ditto, ditto, large. " .50
3367.—Ditto, ditto, ditto, wide, with large bulbs. " .75
3368.—Ditto, ditto, Bohemian, with draining tube in the middle,
 long. Each, .75
3369.—Ditto, ditto, with stop-cock. " .75
3370.—Ditto, for vaccine. Per hundred, \$5.00
3371.—Ditto, **Specimen**, perfectly round bottom, extra heavy
 glass, to bear corking.

$1\frac{1}{2} \times \frac{3}{8}$	$2 \times \frac{1}{4}$	$2 \times \frac{3}{8}$	$2 \times \frac{1}{2}$	$2\frac{5}{8}$	$2 \times \frac{3}{4}$ in.
.20	.25	.30	.35	.40	.43 per doz.
$2\frac{1}{2} \times \frac{7}{8}$	$3 \times \frac{1}{4}$	$4 \times \frac{3}{8}$	$4 \times \frac{1}{2}$	$4 \times \frac{5}{8}$	$4\frac{1}{4} \times \frac{3}{4}$ in.
.45	.48	.50	.55	.60	.65 per doz.
$5 \times \frac{1}{2}$	$5 \times \frac{7}{8}$				6 x 1 in.
.75	.80				\$1.00 per doz.



- 3372.**—Tubes, Vogel's modification of Woulff's apparatus, a substitution for Woulff's bottles by insertion into the neck of an ordinary bottle. \$1.00
- 3373.**—Ditto, ditto, with funnel tube. 1.25
- 3374.**—Tubing, barometer. Per lb. .75
- 3375.**—Ditto, capillary, 3 ft. length. Each, .06
- 3376.**—Ditto, colored. Per lb. \$2.00



- 3377.**—Ditto, soft Bohemian, French and German. Per lb., .75
- 3378.**—Ditto, ordinary soft glass, according to quantity. Per lb., .50 to .60
- 3379.**—Ditto, single up to $\frac{1}{4}$ in. bore. Each, .10
- 3380.**—Ditto, of hard glass, from pure silicates, entirely free from lead, manufactured expressly for making combustions in organic analysis, of genuine Bohemian glass and no other, $\frac{1}{2}$ to $\frac{3}{4}$ in. Per lb., \$1.00
- 3381.**—Ditto, hard, free from lead, $\frac{1}{8}$ to $\frac{3}{8}$ in. " 1.25
- 3382.**—Ditto, glass, white, of large bore. " 1.50

LIST OF
Numbers, Diameters and Yards Per Pound

OF DIFFERENT SIZES OF

COPPER WIRE,

ACCORDING TO THE BIRMINGHAM WIRE GAUGE.

No. B.W.G.	Diameter in Inches.	Yards per Pound.	No. B.W.G.	Diameter in Inches.	Yards per Pound.	No. B.W.G.	Diameter in Inches.	Yards per Pound.
10	.134	6.007	19	.042	62.98	28	.014	569.5
11	.120	7.646	20	.035	89.86	29	.013	651.3
12	.109	9.705	21	.032	108.5	30	.012	771.6
13	.095	13.12	22	.028	141.7	31	.010	1111
14	.083	17.36	23	.025	176.1	32	.009	1371
15	.072	22.67	24	.022	229.6	33	.008	1736
16	.065	26.29	25	.020	277.9	34	.007	2267
17	.058	33.03	26	.018	342.9	35	.005	4444
18	.049	45.83	27	.016	434	36	.004	6944

TO

*With the kind wishes of the author,
trusting that it will be found useful in
the selection of such articles as may be
required for Scientific investigations.*

As the number of Catalogues issued is limited, please preserve this Copy.

No. _____

NEW YORK, January, 1873.

3383.—Tubing, Earthen, 1 inch bore.

Each, \$1.50

3384.—Ditto, Porcelain. $\frac{1}{4}$ in. bore, $1\frac{1}{2}$ in. bore,

30 in. length.

.75

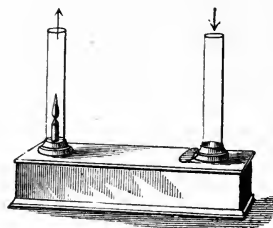
\$1.50 each.



3385



3394



3396



3400

3385.—Ditto, ditto, with flanged ends. $\frac{3}{8}$

1

2 in.

\$1.00

1.50

2.25.

3386.—Ditto, Rubber, black or unvulcanized. $\frac{1}{8}$ $\frac{3}{16}$ $\frac{1}{4}$ in.

.20

.25

.30 per foot.

3387.—Ditto, ditto, vulcanized, lengths cut to order. $\frac{1}{8}$ $\frac{3}{16}$ $\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{4}$ in.

.10

.12

.15

.20

.22

.30

.35 per foot.

3388.—Ditto, ditto, ditto, full pieces. $\frac{1}{8}$ $\frac{3}{16}$ $\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$ $\frac{5}{8}$ in.

.08

.10

.12

.15

.20

.25 per foot.

3389.—Ditto, ditto, ditto, heavy, $\frac{1}{4}$ in. 25, $\frac{1}{2}$ in. 30 per foot.**3390.—Ditto, rubber, extra heavy, barometer, to stand a heavy pressure, assorted sizes.**

Per lb. \$2.00

3391.—Ditto, thermometer.

" .75

3392.—Turmeric Paper.

Per sheet, .05

Twaddle's Hydrometer. See Hydrometer.**3393.—Twine Boxes.**

Each, \$1.00

3394.—Tourmaline Pincers.

Each, \$9, 10, 11, 12

3395.—Twine, small, colored.

Per lb. \$1.50

3396.—Upcast and Downcast Draught, model of, in glass,

Each, \$5.00

3397.—Urinals, male, of glass.

" .25

3398.—Ditto, " of rubber.

" .50

3399.—Urinals, female, of glass, Each, .25
Other articles under this letter. See their respective headings in the Catalogue under other titles.

3400.—Vases, large glass, with flaring top, capacity 2 gallons, for holding sponges, etc. Each, \$2.50

3401.—Vapor Index, Lippincott's.

3402.—Vases, earthen, French, flat bottom, for silver and other solutions held in acid, 10 galls., Each, \$12.00

3403.—V Tubes, for condensing limb, 7 ins. long and $\frac{3}{4}$ in. bore. Each, .50

3404.—Vials, Homeopathic, 1 drachm .15, 2 drachms .20 per doz.

3405.—Ditto, Sample, of fine white French glass, for the preservation of samples; 4 oz. capacity. Per doz. \$4.50

Vogel's Gas Bottle. See Woulff's Tubes.

3406.—Washing Bottles, Faraday's.

8 oz.	pts.	qts.
.60	.75	.90 each.

3407.—Watch Glasses, French, used in pairs, or singly as covers to beakers.

1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	3 in.
.45	.50	.55	.75	\$1.25	1.50	2.00 per doz.

3408.—Ditto, Bohemian, ditto, ditto, ditto, ditto.

2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5 in.
\$1.65	2.25	2.75	3.25	3.75	4.50 per doz.

Ditto, ditto, holders. See Holders.

3409.—Watch Springs, for burning in oxygen. Per doz. .30

3410.—Water Baths, copper, with 3 concentric rings and spun bottom.

5	5 $\frac{1}{2}$	6 in.
\$2.00	2.50	3.00 each.

3411.—Ditto, ditto, ditto, nickleized.

5	5 $\frac{1}{2}$	6 in.
\$2.50	3.00	3.50 each.

3412.—Ditto, copper, of extra large size, \$4.50 to \$10.00.

3413.—Ditto, porcelain.

4	6	8 oz.
\$1.25	1.50	2.00 each.

3414.—Ditto, ditto, with handle on side.

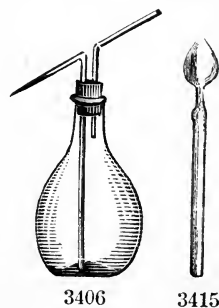
Each, \$1.00

3415.—Water Hammer.

.75

3416.—Ditto, ditto, singing.

1.00



3406

3415

H. TROEMNER'S STANDARD WEIGHTS.

Weights, either gramme or grain, in French polished boxes lined with velvet, every piece fitted separately. Brass weights lacquered; the fraction of the gramme are platinum, except below 20 milligramme, which are made of aluminum. Adjusted to the utmost accuracy. Special weights furnished to order.



3417.—Weights of Precision,	in fine velvet lined polished block, 1 platinum gramme to 1 mili.	\$6.00
3418.—Ditto.	1 “ “ $\frac{1}{10}$ mili.	7.00
3419.—Ditto.	10 gramme to 1 mili.	7.50
3420.—Ditto.	10 “ $\frac{1}{10}$ mili.	8.50
3421.—Ditto.	50 “ 1 mili, 3 riders.	10.50
3422.—Ditto.	100 “ “ “	12.00
3423.—Ditto.	100 “ $\frac{1}{10}$ mili, 3 riders.	13.00
3424.—Ditto.	200 “ 1 mili.	16.00
3425.—Ditto.	Gold Assay Weights.	7.00

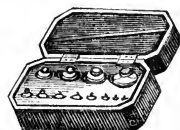
All riders weigh 10 mili., unless otherwise ordered.

3426.—Assay Ton Weights,	4 A. T. to $\frac{1}{20}$ A. T.	\$6.50
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(The assay ton weights have been introduced by Dr. C. F. Chandler, of the School of Mines, Columbia College, New York, where they are in use for convenience in the assay of ores. The weight denominated by Dr. Chandler “One A. T.” equals 29,1666 grammes, and contains, consequently, as many milligrammes as there are troy ounces in a ton avoirdupois of 2,000 lbs. Therefore, if One A. T. of ore assays 1 milligramme, the ton contains, of course, 1 ounce troy.)

3427.—Weights,	10 platinum grains to $\frac{1}{10}$ grain.	\$5.00
3428.—Ditto.	10 “ “ $\frac{1}{100}$ grain.	6.00
3429.—Ditto.	10 “ “ $\frac{1}{1000}$ grain.	7.00
3430.—Ditto.	100 grains to $\frac{1}{100}$ grain.	7.00

- 3431.—Weights,** 1000 grains to $\frac{1}{10}$ grain, 3 riders. \$10.00
3432.—Ditto. 1000 grains to $\frac{1}{100}$ grain, 3 riders. 11.00
3433.—Ditto. 1000 grains to $\frac{1}{1000}$ grain, 3 riders. 12.00
3434.—Ditto. 4 oz. troy to $\frac{1}{10}$ grain. 8.00
3435.—Gramme Weights, in mahogany block, 500 grammes to 1 gram. \$8.00
3436.—Ditto. 500 grammes to 1 centi. 12.00
3437.—Ditto. 500 grammes to 1 mili. 14.00
3438.—Ditto. 1 kilo. to 1 gram. 12.00
3439.—Ditto. 1 kilo. to 1 centi. 16.00
3440.—Ditto. 1 kilo. to 1 mili. 18.00
3441.—Ditto. 1 oz. troy to $\frac{1}{10}$ grain. 4.00
3442.—Ditto. 2 “ “ “ 5.00
3443.—Ditto. 5 “ “ “ 7.50
3444.—Ditto. 10 “ “ “ 10.00
3445.—Weights, sets of fractions of millegrammes, accurately balanced. Each, \$2.50
3446.—Ditto, French, brass, $\frac{1}{2}$ to $\frac{1}{16}$ oz. \$1.50
3447.—Ditto, ditto, mahogany boxes, 50 grammes down. \$3.00
3448.—Ditto, ditto, 100 grammes down. 4.00
3449.—Ditto, ditto, 300 “ “ 5.00
3450.—Ditto, ditto, 1000 “ “ \$7.50
3451.—Ditto, ditto, in polished wood boxes, 1 lb. to $\frac{1}{2}$ grain down.
3452.—Ditto, subdivision of grammes. .50
3453.—Ditto, from 1 lb. avoirdupois, down to $\frac{1}{4}$ oz. \$4.50
3454.—Wire, brass, for making scratch brushes, etc.; No. 20 up to No. 40. Per lb. \$3.00 to 5.00
3455.—Ditto, copper, $\frac{1}{8}$ in. Per lb. \$2.00
3456.—Ditto, silk wound. “ 3.00
3457.—Ditto, copper, silk wound, for making Ruhmkorff's coil and other electrical apparatus. Per gramme, .12
3458.—Ditto, piano, for blow-pipe experiments. Per lb. \$1.50
3459.—Ditto, magnesium. Per foot, .06
3460.—Ditto, gauze of copper, according to fineness. Per sq. ft., .50 to \$1.00
3461.—Ditto, brass. “ .40 to .90



3448

3462.—Wire, iron, price according to fineness.

3463.—Woulff's Apparatus, for washing Gases.

8 oz.

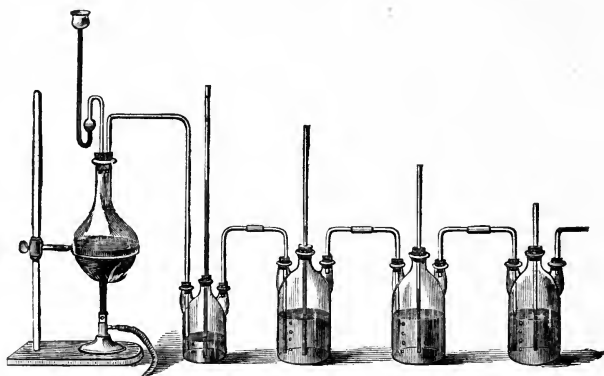
16 oz.

qts.

\$5.50

6.60

8.00



3463

3464.—Ditto, with lamp.

8 oz.

16 oz.

qts.

\$10.00

12.00

14.00

Wurtz' Apparatus, for Fractional Distillation. See Distillation.

3465—Woulff's Apparatus, with gas bottles instead of flasks, and dispensing with lamp and stand. \$4.00 to 6.50

3466.—Zinc, Filings. Per lb. .25

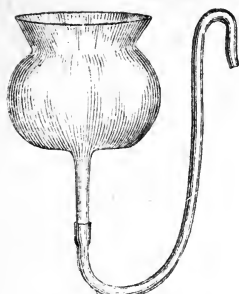
3467.—Ditto, Sheet. " .20

3468.—Zincs, for bichromate batteries, cast. .25 to \$3.00

3469.—Ditto, for Bunsen's batteries, heavy rolled. \$1.50 to 3.00

3470.—Ditto, for Daniells'. .75 to 1.50

3471.—Ditto, for Grove's or Smee's, cast. Per lb., .18



No. 3676.

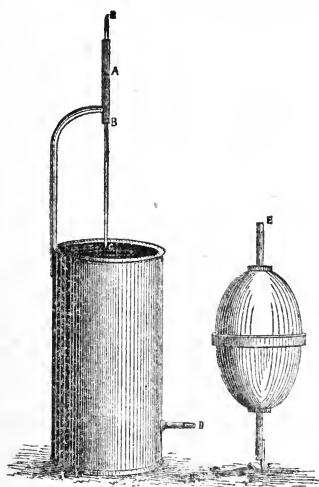
FILTER QUICK, CASAMAJOR'S.

Each, \$0 75.

This Filter has been fully described in the August, 1875, number of the *American Chemist* and is found to be very useful, not only in filtration, but also in thoroughly drying the precipitates afterwards.

CONSTANT WATER BATH LEVEL.

Each, \$7 50



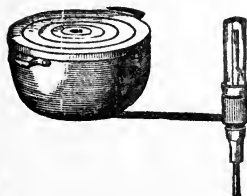
No. 3677.

The cut annexed represents a very useful copper apparatus, contrived by Dr. J. Lawrence Smith, of Louisville, to maintain a continued level of water in a series of water baths.

The outer vessel has an arm which sustains a glass pipette drawn at the lower end (C), and held in position by small pieces of caoutchouc tubing (A. & B). This pipette passes through the metallic swimmer (E) placed within the above named vessel. Under the bottom of the swimmer is an elbow supporting a rubber cushion (F), which—when the swimmer is buoyed above the desired level—presses against the drawn point of the pipette, and stops the flow of water. The top of the glass pipette (B) is united to the water supply, and the discharge tube (D) projecting from the

foot of the outer vessel, is connected with the water baths.

Bunsen's Improved Water Bath for Constant Level,



No. 3679.

Consists of the usual copper bath with concentric rings, with the addition of a connecting tube running from the bottom and joined to a simple arrangement by which the level of the water in bath is maintained. The inner tube (A) passes through the bottom of the attachment (C), being held in place by a rubber tube, so that it may be lowered or raised to answer to the height of water required in the water bath. (B) is an outer tube through which the water is supplied from the hydrant, the overplus passing out through the tube (A).

This supplies a want long experienced by chemists, for in using the old form, in case the analyst is called from his work, there is a risk of the water being evaporated from the bath during his absence.

A tripod may be attached to the apparatus to support it.

Buyers cannot be too much impressed with the absolute advantage of purchasing direct from a responsible dealer in chemical apparatus, who understands the uses of such goods, and has a reputation at stake in his *special* line; who has the *goods in stock* adapted to the purposes advertised, and has no occasion to provide any makeshift of supposed resemblances to catalogue illustrations. Very frequently I receive advices from chemists, stating that they have handed orders for apparatus, chemicals, etc., selected from my catalogue, to dealers near them, which goods were never bought from me by their agents, resulting in furnishing the chemist with poor apparatus, and reflecting unjustly on the character of my stock. Only by buying *direct* can the chemist be sure that his entire order comes from a dealer in chemical apparatus.

Every intelligent chemist knows that the labor of preparing an analysis is liable to be lost from the use of imperfect or badly annealed vessels, and will therefore avoid investing in poor articles because they may happen to be cheap.

E. B. BENJAMIN.

PROF. RICHARDS' ASPIRATOR.

A Substitute for the Bunsen Pump.....each, \$1 50



C represents the Aspirator invented by Prof. Robert H. Richards, of the Mass. Institute, of Technology, Boston, and used for the purpose of quick filtration. It is the result of a number of careful experiments made by the above gentleman, and for simplicity of design and the ease with which it can be manipulated, together with its efficacy, it recommends itself to all who wish a good effective filter-pump, without being compelled to pay the high price which a more elaborate piece of apparatus would obviously command. In order to use this pump, all that is necessary to do is to connect the tube at the top with the faucet of an ordinary hydrant, by means of a length of rubber tubing, whilst the filtering flask carrying the funnel is attached to the tube at the left of the pump. Upon allowing the water to flow through the latter, the air in the cylindrical part surrounding the small interior tube is caught,

as it were, by the water, and drawn into the lower tube, thus producing a rarefaction of the air in the tube at the left and in the filtering flask. The result is a flow of water through the funnel and its contained precipitate, and a thorough washing of the latter. By continuing the working of the pump after washing the precipitate, the latter may be so completely dried as to be ready for ignition in a crucible, and the pump is also cleared well at the same time. As a certain ratio exists between the size of the orifice of the interior tube, the diameter of the exterior tube, and the force of water issuing from the hydrant, it will be necessary for parties ordering the apparatus of me to state the approximate fall and force of water at their command, that the pump may be made to correspond.

FUNNEL FOR RAPID FILTRATION.

Casamajor's modification of Carmichael's process.....each, \$0 50



No. 3674.

This is represented at *D* as a small inverted funnel. The original funnel, as conceived by Carmichael, was made entirely of glass, with a bottom perforated with fine holes, these holes being produced, whilst the glass was in a state of semi-fluidity, by means of a red-hot needle. This being a very uncertain, if not an impossible undertaking, the idea occurred by Mr. P. Casamajor, of Williamsburgh, that by making use of a funnel provided with a movable bottom or diaphragm of platinum the end might be attained. This funnel was tried and found to answer all that was required of it, and it is now offered to the chemist as a cheap, efficient and very

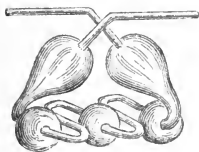
convenient apparatus for rapid filtration. It is made as shown in the cut, of glass, with its stem bent at a right angle, the part shaped like a bell being provided with a circular disc of platinum perforated with fine holes. (The disc is not shown in the diagram.)

The *modus operandi* is as follows: The disc, whose diameter is about 20mm., is laid upon a piece of filter paper (Swedish being generally preferred), and a circle of 25mm. is cut out of the latter, thus leaving a small margin all around the edge of the platinum. The latter is then separated from the paper and laid upon the funnel, completely covering the large opening. The paper is then moistened and laid over the platinum, covering it and extending over the edge all around, where it is brought in contact with the glass.

The funnel is then connected by means of a rubber tube attached to its stem with the flask, which is in turn put in communication with the filter-pump. The mouth of the funnel, which is quite small, is then placed in the platinum or porcelain vessel in which the precipitate is to be ignited, and is poured into the vessel. Upon starting the pump the filtration begins, and is continued as long as necessary, with a small disc of washing, etc., being a precipitate in the dish the final result, after paper upon it, the ash of which, after ignition, may be disregarded. The upper edge of the funnel holds a little of the precipitate which may be weighed with the funnel itself.

IMPROVED FORM OF LIEBIG'S POTASH BULB.

By Alvergniat Freres, Paris.... each, \$1 00



No. 3675.

This piece of apparatus is shown at *E*, and differs from what has always been known as Liebig's Potash Bulb, in having the lower bulbs connected by curved instead of straight tubes; at the same time the circular bulbs at the side are replaced by pear-shaped ones, the latter as well as the extra length of Tubing giving increased contact of gas and liquid, and thereby increased absorption. Again, the extension of the tubes (at the lower part) to one side, forms a base of support, so that the apparatus may be placed upon the pan of the balance and readily weighed, without the trouble of attaching wires to the upper part, and *hanging* it to the beam.

These bulbs are used by many at present in preference to the older form, and bid fair, in time, to supersede them; for this is an age of progress as well in the chemical laboratory as anywhere else, and it is but natural for the analyst to select for his work those pieces of apparatus which can be most conveniently used, while at the same time performing their work satisfactorily.

PLATINUM.

The increasing demand for the "*non-blistering*" Platinum, of which my establishment is the depot, has enabled the company which I represent to grant me extra facilities in this line of goods, and I would respectfully request a comparison of the quality of these goods with those sold elsewhere.

FRICTIONAL ELECTRICAL MACHINES.

I have nearly perfected arrangements for bringing forward a new Patent Electric Machine, yielding long sparks, and adapted to the means of our academies and schools. The price will be about twenty-five dollars each. The larger electric machines *now made here* are materially reduced in price, in consequence of decline in cost of making.

BALANCES AND WEIGHTS.

My patrons will receive herewith a list of Balances and Weights published by Henry Tröemner, which they will please substitute for those of Becker & Sons, published in my Catalogue of '72. Mr. H. Tröemner having appointed me a special agent here for his Analytical Balances and Weights, all sold by me are guaranteed fully equal to any sold in this country.

CHLORIDE OF CALCIUM TUBES.

Two Bulb with Interior Tubeeach, \$0 50



This is a new form of Chloride of Calcium Tube, devised by Prof. Mixer, of Sheffield Scientific School, New Haven, and in use at that Institution. It is an improvement upon the old form of drying tube, the difference consisting in the addition of a small interior tube, reaching nearly across the smaller of the two bulbs. The advantage which it has over the old form can be seen at a glance, although no one can fully appreciate its usefulness without having used both styles. When in use, the gas is caused to flow from the smaller end to the larger one, the large bulb and tube being filled with the drying material, chloride of calcium.

No. 3678 During the passage of the hygrometric gas, the aqueous vapors condense, for the most part, in the smaller bulb, only a comparatively small amount being carried over into the chloride of calcium. For this reason the latter may be used over again, and the operation repeated several times without refilling the tube.

The part which the small interior tube plays is, to keep the water which collects in the small bulb from running into the large one, a disadvantage to which the old form is subject. Furthermore, the tube may be used in an incline or even vertical position without inconvenience, and still do excellent service.

The use of cotton may be dispensed with in this form of apparatus, as the very small bore of the interior tube will, if care be taken to select *lumps* of chloride of calcium (instead of the same *powdered*), prevent them from falling through into the small bulb.

RADIOMETERS.

Crookes' each \$7 50 to \$9 00



No. 3672.

The Radiometer, invented by Wm. Crookes, Esq., F. R. S., of England, and manufactured in its most elegant form by Dr. Geissler, of Germany, the manufacturer of the world renowned "Geissler Tubes," (who has appointed me his agent for their sale), is shown in the accompanying figure. It consists in the main of four radial arms of very thin metal, carrying at their extremities diamond shaped pieces of a peculiarly light substance, the character of which varies somewhat in each manufactory. The system is delicately poised at its centre upon a needle fastened into the extremity of an upright rod of glass, and kept from falling from the same by a vertical glass tube, whose lower extremity projects over the cap of glass which rests upon the needle, and upon which the arms are fastened. The whole is enclosed in a shell of glass, pleasing in design and strong enough to resist the pressure of the external atmosphere (for the apparatus is exhausted as perfectly as can be done by a sprengel pump, to obviate as much as possible the resistance which would be caused by the air).

Upon placing the apparatus in the sunlight, or allowing the light from a magnesium or electric light to fall upon it, the radial arms begin to revolve, and continue to move as long as the light rays last, the velocity of revolution increasing or decreasing in proportion to the intensity of the light.

NO. 10 BARCLAY STREET,

NEW YORK, *November 1, 1876.*

Thanking my many kind patrons for their generous support the past years, I beg respectfully to present this list to their careful perusal and attention.

The long established and celebrated house of Dr. Trommsdorff having granted me extra facilities on their pure chemical products, I beg permission to present to my kind patrons the following low prices for rare and pure chemicals, prefacing the same with the observation, that as I have no trade for drugs, buyers will perceive that I have no temptations to substitute ordinary chemicals for *pure*; therefore, the accompanying list is intended for only the best article of its kind of the sort named.

There is also added to the list of chemicals, some few new styles of Apparatus which are not in my catalogue, and I beg to add that I am also making material reduction in such American made articles as the lowest prices of labor at this time warrant. For example: Combustion Furnaces, 25 Burners, quoted formerly at \$50.00, I now sell at \$40.00; ordinary Bunsen Burners, at \$7.00, net, the dozen, &c., &c.

Buyers will kindly compare the German and Bohemian glassware as to quality, and as there is about 50 per cent. difference in cost abroad, any ordinary offer of discount is not likely to cover the difference in quality, any more than such discount will cover the difference between Semi and Royal Porcelain. By comparing, for example, the Bohemian Funnels No. 2318 with the German Funnels No. 2322, an approximation of the difference may be arrived at.

The genuine Bohemian *Flasks* and other glassware may be distinguished from the German, French and American by a delicate greenish tint across the tops of the vessels; other glass, French especially, being nearly white, or straw color tint.

Again, the Beakers ordinary quoted at $1/3$ are identical in size with my $0/2$, and those called $1/5$ are identical with my $0/4$, &c. —my estimate of capacities allowing for boiling. *The sizes named by me are the same as filled in Europe, and I am not responsible for sizes made up here by any other dealer.* A comparison will show that my prices are, and have been very low, and so of other goods.

RECOMMENDATIONS.

Those of my patrons who have always taken an active interest in my success, will be pleased to learn that the Prize Medal has been awarded to me, alone, at the International Exhibition at Philadelphia *over all competitors in the United States*, "for Pure and Rare Chemicals and Chemical Apparatus of excellent design and finish," by the Judges in the group comprising this class of goods. The Judges are: Charles A. Joy, Ph. D., Professor of General Chemistry, Columbia College, N. Y.; F. A. Genth, A. M., M. D., Professor of Analytical Chemistry, University of Pennsylvania, Philadelphia; Dr. J. Lawrence Smith, the celebrated Chemist of Louisville, Ky.; Professor C. F. Chandler, Ph. D., M. D., LL. D., Professor of Analytical and Applied Chemistry, School of Mines, Pharmacy, &c.; Professor J. W. Mallett, Ph. D., University of Virginia, and the following eminent gentlemen from Europe, viz.: Dr. William Odling, F. R. S., and Professor of Chemistry, Oxford University, of Great Britain, chief among English chemists; R. Van Wagner, of Germany, editor of the *Jahresbericht der Technologischen Chemie*; J. F. Kuhlman fils, of Lisle, France, probably the largest manufacturer of chemicals in the world; Prosper de Wilde, Belgium, and Emanuel Paterno, Italy, all of whom are justly celebrated in the scientific world. The award of which these renowned gentlemen have deemed my goods worthy, will, I trust, stimulate my countrymen to encourage all efforts to place this establishment on a par with any other abroad.

CHEMICALS AND REAGENTS.

THIS List comprises the majority of Chemicals I keep, though there are a number of strictly commercial articles that usually rank under the head of Chemicals, which are omitted, but which I have the fullest facilities for shipping at the lowest market rates.

The prices given are for usual quantities. If large amounts of any article herein priced are desired, I should be pleased to give the benefit of the lowest market quotations, according to the market values at the time.

I have frequently procured Crude Stock Chemicals, Drugs, and other articles for class illustrations in Organic and Applied Chemistry, for my patrons at a distance, and will take pleasure in serving them in this manner in the future, charging only a small per centage for my time and trouble.

Standard Test Solutions, according to Fresenius and other authorities, carefully prepared to order at moderate rates.

Great attention is paid to neatness, cleanliness and accuracy in dispensing reagents.

Complete collections of the elements made and arranged on demand; also suits of the principal spectroscopic salts, neatly put up in glass stoppered vials, for either class illustrations or Laboratory purposes.

E. B. BENJAMIN.

ABBREVIATED TERMS AND TRADE MARKS, USED IN THIS WORK.

Sol.=Solution; Precc.=Precipitated; lb.=pound; oz.=ounce; dr.=drachm; gr.=grain; grm.=gramme; Mg.=Milligramme; C. C.=Centimeter; pt.=pint; qt.=quart; gal.=gallon; Opt.=best, next to pure; pure=next to C. P.; C. P.=Chemically pure; U. S. P.=United States Pharmacopæia; Puriss=extra C. P.; T=Trommsdorff's; M.=Merck's; Spec.=Specimen; Com'l=Commercial; com.=common; Sub.=Sublimed; F. F.=Forte Fortissimo, or very strong; F. F. F. F.=Double; Conc.=Concentrated; Fren. or F. T.=Fresenius' Test; Sp. Grav.=Specific Gravity; Am.=American.

COMPARATIVE TABLE OF WEIGHTS.

1 pound Avoirdupois,	=	7000 grains.
1 ounce “	=	437½ “
1 drachm,	=	54.69 “
28.35 grammes,	=	1 ounce Avoirdupois.
31.10 “	=	1 “ Troy.
453.60 “	=	1 pound Avoirdupois.
1 “	=	15.43¼ grains.
100 “	=	3.53 ounces Avoirdupois.
100 “	=	3.21½ “ Troy.
1000 “	=	1 Kilo
1 Kilo.,	=	2.20½ lbs. Avoirdupois.

PRICE LIST.

A.

Acetone , C. P.....	Per oz., \$	.30
Acid , Acetic, U. S. P., Sp. Grav., 1047.....	Per lb.,	.30
“ Ditto, strictly C. P., Sp. Grav., 1047 U. S. P., same quality as Baufoy's best Eng.....	Per lb.,	.50
“ Ditto, Acetic, Glacial.....	Per lb., \$1.25, Per oz.,	.15
“ Antimonic, C. P.....	“	.15
“ Arsenic.....	Per lb., \$1.50 “	.15
“ Arsenious, C. P.....	“ 1.00 “	.10
“ Ditto, Lump Coml., very com....	“ .20	
“ Boracic, C. P. fused, pow'd.....	“	.15
“ Benzoic, True.....	“	.25
“ Ditto, Com. Artificial.....	“	.15
“ Butyric, Puriss.....	“	.40
“ Camphoric, True.....	per oz.,	2.50
“ Chloric.....	“	
“ Carbazotic, Puriss.....	“	1.00
“ Capronic.....	“	3.50
“ Carbohc, White Cryst.....	Per lb., \$1.50 Per oz.,	.15
“ Ditto, Com'l	“ 1.00 “	.10
“ Chromic, C. P., Cryst.....	“	.30
“ Cresylic, C. P., Cryst.....	“	.40
“ Citric, C. P., Cryst... Puriss.....	Per lb., \$2.50 Per oz.,	.20
“ Formic, C. P.....	“	.25
“ Fluoric. See Hydrofluoric, in 1 oz. and 8 oz. bot- tles.		
“ Gallic, Puriss.....	“	.40
“ Gallotannic.....	“	.65
“ Hippuric.....	“	3.00
“ Hydriodic.....	“	1.25
“ Hydrobromic	“	.60

Acid, Hydrocyanic, U. S. P.....	Per oz., \$	.10
“ Hydrofluoric, in gutta percha bottles, with bottle. Per lb.,		2.25
“ Hydrofluosilicic, C. P.....	“	1.00
“ Hydrochloric. See Muriatic.		
“ Hypophosphorous, Sol.....	Per oz.,	.40
“ Iodic, C. P.....	“	2.00
“ Lactic, C. P., Conc.....	“	.50
“ Malic.....	“	1.50
“ Margaric, C. P.....	Per dr.,	.40
“ Meconic.....	Per oz.,	8.00
“ Mucic	“	1.00
“ Molybdic, C. P., T.....	Per oz.,	.50
“ Muriatic, C. P., in 1 and 6 lb. bottles.....	Per lb.,	.27
“ Ditto, Com'l.....	“	.06
“ Ditto, special price for Carboy.		
“ Nitric, C. P., 1 and 7 lb. bottles.....	“	.35
“ Ditto, Com'l. Per carboy, special prices.	“	.15
“ Ditto, Fuming Red. C. P. (rare quality).....	“	2.25
“ Ditto, ditto, ditto.....	“	1.50
“ Nitrohydrochloric, Pure.....	“	.50
“ Oxalic, C. P. T., according to quality.....	“	1.25
“ Ditto, C. P., Am., very superior.....	“	.50
“ Ditto, Coml.....	“	.25
“ Oleic, C. P.....	Per oz.,	1.50
“ Phosphoric, U. S. P.....	“	.05
“ Ditto, Glacial, C. P. T.....	“	.20
“ Phosphorous, C. P., Sol.....	“	.10
“ Phenic, Crystals, Pure.....	“	.15
“ Phosphomobybdic, Sol.....	“	1.00
“ Phosphowolframic, Sol.....	“	.80
“ Pyrogallie, Leviss, C. P. T.....	“	.80
“ Ditto, Alb. Sub. Puriss.....	“	.50
“ Pyroligneous, Refined.....	Per lb.,	1.00
“ Prussic, “ Scheeles”.....	Per oz.,	.25
“ Salicylic.....	“	.50
“ Pietric, True.....	Per oz.,	.40
“ Silicic, Pure Native, Pow'd.....	Per lb.,	.25
“ Ditto, C. P., Precc., T.....	Per oz.,	.25
“ Succinic, Pure Alb. Cryst.....	“	40

Acid, Stearic, Puriss., for delicate analysis.....	Per dr., \$	.60
“ Ditto, Com.....	Per oz.,	.10
“ Suberic	Per dr.,	1.75
“ Sulphuric, C. P., 1 and 9 lb. bottles.....	Per lb.,	.40
“ Ditto, Com'l.....	“	.06
“ Ditto, Nord, in cans and bottles.....	“	.35
“ Ditto, per Carboy, special price.		
“ Tannic, C. P., Leviss.....	Per oz.,	.30
“ Ditto, Pure.....	“	.15
“ Tartaric, Pure, Cryst.....	Per lb.,	.75
“ Ditto, C. P., for accurate analysis.....	“	1.75
“ Ditto, Powdered, Com.....	“	.60
“ Titannic.....	Per dr.,	.40
“ Uric, C. P., Cryst.....	Per oz.,	1.25
“ Uranic, Com.....	Per oz.,	1.25
“ Valerianic.....	Per oz.,	.60
“ Vanadinic, C. P.....	Per dr.	8.00
“ Wolframie. See Tungstic Acid.....	Per oz.,	.40
Alcohol, 95pr.c.; special price large quantity.....	Per gal.	3.00
“ Absolute	Per lb.	.80
“ Ammoniated.....	“	1.00
“ Amylic.....	“	2.50
“ Methylic, nearly inodorous and free from Amylic Alcohol. This will be found to be an excellent and cheap substitute for Wine Alcohol in all heating operations. It possesses decidedly greater heating power than Wine Alcohol, and is recommended to the attention of all chemists and experimenters living where gas cannot be procured or used. Per gal., \$1.65, by the keg or cask.....	Per gal.	1.40
Albumen, from blood.....	Per oz.	.25
“ “ milk	“	.50
“ “ eggs.....	“	.20
Aldehyde	Per oz.,	.40
Aluminium, Mett, foil.....	“	2.30
“ “ wire	“	2.90
“ Chloride, C. P.....	“	.35

Aluminium , Fluoride. Native; see Minerals.....	Per lb., \$	.50
Alumina , Precc., Puriss., hydrated.....	Per lb.,	2.00
“ Acetate.....	Per oz.	.30
“ Bromide.....	Per oz.,	.50
“ Sulphate, Pure Cryst. Leviss.....	Per oz.,	.20
“ “ and Ammonia, Puriss.....	Per lb.,	1.00
“ “ “ “ Crude, Com....	“	.10
“ Ammonia, Cryst. and Pulv.....	“	.25
Alum , Potassa C. P. T.....	“	.25
“ Iron.....	Per oz.,	.10
“ Chrome, Cryst., Pure.....	“	.10
“ Ammonia, Ferric.....	Per lb.,	1.00
Amber , small pieces.....	Per oz.,	.20
Ammonia , Aqua, Conc., U. S. P., 4½ lb. bottles.....	Per lb.,	.35
“ Liquor. F. F. F., 26½ per cent. of gas.....	Per lb.,	.35
	Per oz.,	.05
“ Spirits, U. S. P.....	Per lb.,	.20
“ Acetate, Cryst., C. P.....	Per oz.,	.50
“ Ditto, Sol., C. P.....	“	.25
“ Arseniate.....	“	.30
“ Benzoate, C. P.....	“	.90
“ Bichromate.....	“	.40
“ Bromide.....	“	.35
“ Carbonate, pure.....	Per lb.,	.75
“ Ditto, Com.....	“	.60
“ Citrate and Citrate Iron.....	Per oz.,	.25
“ Citrate.....	Per lb.,	2.50
“ Gallate, pure.....	Per oz.,	1.50
“ Hydrosulphide, Liq.....	Per lb.,	.75
“ Hydrofluorate, Cryst., C. P.....	Per oz.,	1.50
“ Hypophosphite.....	“	.30
“ Molybdate, C. P., Cryst.....	“	.75
“ Monocarbonate, C. P.....	Per lb.,	1.50
“ Chloride, C. P.....	“	.50
“ Ditto, Com'l.....	“	
“ Nitrate, Cryst., C. P.....	Per lb., \$1.00, Per oz.,	.10
“ “ fused Am., Pure.....	Per lb.,	.40
“ Oxalate, C. P., Cryst.....	Per lb., \$1.80, Per oz.,	.20
“ Phosphate, Cryst., Pure.....	“	.20

Ammonia,	Succinate, T., Cryst.....	Per oz., \$	.80
"	Sulphate, Com.....	Per lb.,	.12
"	" C. P.....	"	.70
"	Sulphocyanide.....	Per lb., \$3.00, Per oz.,	.25
"	Urate, C. P.....	"	.80
"	Valerianate	"	.80
"	Vanadate.....	Per gr.,	.20
Amygdalin		Per dr.	2.75
Amyle,	Acetate.....	Per oz.,	.50
"	Butyrate	"	.50
"	Formate.....	"	.50
"	Nitrite, Pure.....	"	.60
"	Valerianate.....	"	.75
"	Hydrochlorate.....	"	.75
Amalgam,	Mercury.....	Per box,	.75
"	Fusible.....	"	.50
Antimony,	Chloride, Sol.....	Per lb.,	.40
"	" Cryst., C. P.....	Per oz.,	.40
"	Iodide, Cryst., C. P.....	"	.90
"	Proto Oxide, white, C. P.....	"	.15
"	Golden Sulphide.....	Per lb.,	.75
"	Black " Levigated.....	Per lb., .35, Per oz.,	.05
"	Ditto, Native.....	Per lb.,	.20
"	Tartrate, Cryst., Pure.....	"	2.00
"	Ditto, and Tart Potassa.....	"	1.25
"	Mett, Best.....	"	.20
Aniline,	Pure, Liq.....	"	2.50
"	Sulphate, C. P.....	Per oz.,	.75
"	Red.....	"	.90
"	Scarlet.....	"	
"	Blue.....	"	
"	Violet.....	"	
"	Pink.....	"	
"	Green.....	"	
"	Black.....	"	
"	Yellow.....	"	
"	Orange.....	"	
"	Purple.....	"	
Animal Charcoal,	Gran., Best.....	Per lb.,	.10

Animal Charcoal, Com	Per lb., \$	.08
“ “ Pulv. Fine.....	“	.10
Arsenic, Native Mett	“	.50
“ Pulverized	“	.25
“ Bromide.....	Per oz.,	1.25
“ Iodide.....	“	.75
“ Chloride	“	.80
“ Oxide Proto. See Acids.		
“ “ Per “ “		
“ Sulphide Per.....	Per lb.,	.20
“ “ Proto	“	.25
Argols, Crude	“	.25
“ Refined	“	.30
Asparagm, C. P	Per dr.,	.30
Asphaltum, Opt	Per lb.	.15
Asbestos, Long Fibre	Per oz.,	.15
“ Short “	Per lb.,	.60
Atropia, Pure	Per gr.,	.06
“ Sulphate	“	.06

B.

Barium, Chloride, Com	Per lb., .20, Per oz.,	.05
“ “ C. P.....	“ .30, “	.05
“ “ Puriss., T.....	Per lb.	.40
“ Fluoride	Per oz.,	1.00
“ Mett., Spec.....	Per Gram.	4.50
“ Iodide, C. P.....	Per oz.,	1.00
“ Hyperoxide, C. P., T.....	“	.45
“ Proto-oxide, “	“	.30
“ Sulphide	“	.10
Baryta, Acetate	“	.20
“ Caustic, Cryst., C. P.....	Per lb., \$1.00, “	.10
“ Carb., Native.....	Per lb.	.25
“ “ Precc., C. P., T.....	“	.80
“ Chlorate, C. P., T.....	Per oz.,	.40
“ Nitrate, Cryst., C. P.....	Per lb.,	.50
“ “ Com'l	“	.30
“ Sulphate.....	“	.75
“ “ Opt., Pure.....	Per oz.,	.10

Baryta , Water, per fluid oz.....	Per oz., \$	.05
Beeswax , White.....	"	.10
" Yellow	Per lb.,	.75
Berberine , Pure.....	Per oz.	3.50
" Sulphate	"	4.25
Benzoin , Gum.....	Per oz.,	.10
Benzole , Genuine.....	Per pt.,	.60
Benzine	"	.15
Bismuth , Mett.....	Per oz.,	.75
" Ammoniocitrate.....	"	.10
" Mett, Puriss.....	"	.75
" Acetate, Pure.....	"	.25
" Carb.....	"	.75
" Chloride.....	"	.30
" Oxide, Hydrated.....	"	.75
" Nitrate, Cryst.....	"	.40
" Sub. ditto, Powdered.....	"	.50
" Tannate.....	"	.80
" Valerianate, C. P.....	"	1.50
Black Flux	Per lb.,	2.00
Bone-Ash , Am. (by the bbl, or 50 lbs., or more, special price).....	"	.25
" French.....	"	.40
" Washed.....	"	.60
Bleaching Powder	"	.15
Borax , Refined.....	"	.16
" Glass.....	Per lb., \$3.00, Per oz.,	.25
" Pulverized.....	"	.10
Brazil Wood , True.....	Per lb.,	.25
Bromoform , C. P.....	Per oz.,	2.50
Bromine , Pure.....	"	.25
" Chloride.....	"	.75
Brucia , C. P.....	Per oz.,	4.00
" Nitrate.....	"	4.50

C.

Cadmium , Mett, in stick; Pure, T.....	Per oz.,	.25
" " Ribbon.....	"	.75
" Bromide.....	"	.05

Cadmium,	Carbonate	Per oz., \$	.75
"	Chloride.....	"	.60
"	Iodide.....	"	.75
"	Sulphide.....	"	1.00
"	Oxide.....	"	.75
"	Sulphate.....	"	.40
Caffeine,	Pure; very superior.....	"	4.50
"	Citrate.....	Per oz.,	5.00
Casein,	" Pure.....	Per oz.,	.10
Calcium,	Mett, per Spec.....	Per gram.	10.00
"	Acetate, C. P.....	Per oz.	.15
"	Carb., Precc.; Pure.....	Per lb.,	1.50
"	Chloride, Fused; C. P., T.....	"	1.00
"	" Gran'l "	"	.50
"	" Cryst. "	"	.25
"	Bromide, Pure.....	Per oz.,	.30
"	Iodide.....	"	.50
"	Nitrate, C. P., Cryst.....	"	.20
"	Fluoride, Pow'd.....	Per lb.,	.10
"	" Cryst., native selected.....	"	.30
"	Phosphide, Pure, T.....	Per oz.	.65
"	Phosphate.....	Per lb. \$2.00, "	.25
"	Sulphide.....	"	.08
Camphor,	Best Borneo.....	"	.07
Carbon,	Bisulphide.....	Per lb.,	.50
"	Trichloride, Liquid.....	Per oz.,	1.25
Carbo,	Animalis.....	Per lb.,	.10
Carmine,	Opt.....	Per oz.	1.00
Cerium,	Mett, per specimen.....	Per gram.	7.50
"	Chloride.....	Per oz.,	2.00
"	Nitrate.....	"	1.50
"	Oxalate, Pure.....	"	1.00
Cæsium,	Chloride.....	Per Gram.	6.00
"	and Rubidium, Chloride.....	Per gr.	.25
Cethyle		Per lb.,	1.00
Chameleon,	Mineral, Pure.....	Per oz.,	.12
Chloral,	Hydrate.....	"	.25
Chlorine,	Aqueous Sol. of.....	Per lb.,	.15
Charcoal,	Willow, Pow'd, Pure.....	"	.35

Charcoal , Willow, Prepared in blocks.....	Each, \$	.10
Chloroform , Opt.....	Per lb., \$1.25, Per oz.,	.20
Chromium , Mett.....	Per gram.	1.20
Chrome , Alum. See Alums.		
Chromium , Chloride, C. P.....	Per oz.,	2.50
“ Sesqui Chloride.....	“	.40
“ “ Oxide.....	“	.30
“ Green “	“	.30
“ Carb.....	“	1.00
Cinnabar . See Minerals.		
Copper , Acetate, C. P., Cryst. T	“	.15
“ “ Com., Pulv'd.....	“	.05
“ Arseniate. C. P. T.	“	.40
“ Arsenite.....	“	.25
“ Ammoniated, C. P., T.....	“	.20
“ Carbonate, C. P., Precc.....	“	.15
“ Chloride, C. P., T.....	“	.50
“ “ Di. “	“	.25
“ Chromate.....	“	.20
“ Cyanide, C. P.....	“	.50
“ Formate.....	Per dr.,	.40
“ Iodide, C. P.....	Per oz.,	.75
“ Nitrate, Cryst., C. P., T.....	Per lb., \$1.00, “	.10
“ Oxalate.....	“	.25
“ Oxide, C. P., Gran. Pow'd, T..	Per lb., \$2.50, “	.25
“ “ Pure, Pow'd, “	2.00, “	.15
“ Reduced Puriss, Pow'd.....	“	.35
“ Mett, Pure Gran.....	Per lb., \$1.85, “	.15
“ “ Thin Foil, Pure.....	“ .75 “	.10
“ Sheet	“ .65 “	.08
“ Scraps	“ .50 “	.06
“ Turnings.....	“ .40 “	.05
“ Sulphate, C. P., T.....	“ .45 “	.10
“ “ Com'l	“ .15 “	.05
“ Ammoniated. C. P. T.	“	.15
“ Sulphide.....	“	.12
Cobalt , Acetate, C. P.....	“	.75
“ Mett, Cubes.....	“	1.25
“ “ C. P., T.....	“	2.50

Conalt , Chloride, C. P., T.....	Per oz., \$	.60
“ Carb., C. P., T.....	“	.75
“ Nitrate, C. P., T.....	“	.65
“ “ C. P., Sol. F. T.....	“	.40
“ Oxalate, C. P., T.....	“	1.00
“ Oxide, C. P.....	“	1.00
“ “ Com'l.....	“	
Codeia , Pure.....	Per dr.,	1.00
Collodion , E. Sol.....	Per oz.,	.18
“ Cotton. Best Parry's.....	“	.75
Conine , Pure German.....	Per dr.,	.75
Cream Tartar , Pow'd.....	Per lb.,	.50
Creasote , White.....	Per oz.,	.15
Crocus-Martis ,.....	Per lb., .12 “	.05
Cryolite , Best. See also Minerals...	Per lb., .25 to .50	

D.

Dextrine , Opt., Pow'd.....	Per lb.,	.20
Distilled Water	Per gal.,	.20
Dutch Leaf	Per book	.10
Didymium , Chloride.....	Per gram.	7.00

E.

Ether , Sulphuric.....	Lot, .60....	Per lb., .90
“ “ Veritable, Conc.....	“	1.35
“ Acetic, Pure Conc.....	Per oz.,	.10
“ Butyric.....	“	.30
“ Chloric.....	“	.20
“ Formic.....	“	.40
“ Nitric, Spirits of.....	Per lb.,	1.25
“ Oneanthic, Pure.....	Per oz.,	8.00
Emery , Flour.....	Per lb.,	.25
“ Pow'd.....	“	.20

F.

✓ Fehling's Sol. , for physicians' and sugar-house use, indicating percentage of grape sugar.....	Per oz.,	.12
Felspar , Pow'd, White.....	Per lb.,	.15
“ Native, Cryst.....	“	.10

Special Heating Apparatus.

FLETCHER'S NEW EVAPORATING BURNER.—For Glass and Porcelain Vessels, and General Laboratory Work. This burner is a great improvement on the ordinary coil burner in use, owing to the fact that no currents of



cold air, which are so fatal to glass and porcelain dishes, can reach the vessel, as is the case with all coil burners. The flames are blue and smokeless, and are not liable to be extinguished with a splash, being raised above the body of the burner. They are made in solid copper, with lap joints (without solder). The total height of the burner is about 1½ inch, and is the same in all sizes.

To get the best results from the burner it should be kept perfectly clean.

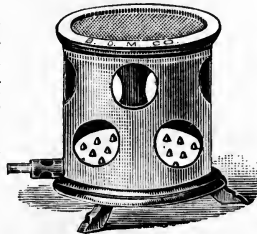
This burner is especially adapted for Dentists' use in the manufacture of NITROUS OXIDE GAS, and is the safest burner known for heating glass and flasks, giving a FLAT flame of any power, which cannot touch the flask.

The diameter of the bulb of flask gives the correct size of burner.

PRICE.

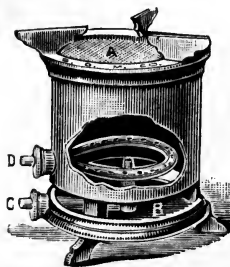
4-inch, \$1.00 ; 5-inch, \$1.50 ; 6½-inch, \$2.00 ; 7¾-inch, \$2.75 ; 9¼-inch, \$3.50 ; 10¾-inch, \$4.00 ; 12-inch, \$5.00.

FLETCHER'S HOT AIR BATH, for Pharmaceutical purposes.—This is formed by the addition of a perforated cylinder covered with strong wire netting, flat or hollow as required, to the copper evaporating burner. All sizes will take any vessel from the smallest to the largest ; in selecting for general work it may be taken as a rule that any burner at its maximum power will boil the contents of a porcelain dish double its own diameter, *i. e.*, a 4-inch is best for dishes up to 8-inches diameter, &c.



PRICE.

Hot Air Bath, 4-inch, (only size in stock), \$2.00



No. 7. LOW TEMPERATURE BURNER.

A new and improved pattern is now made superseding the old patterns. This Burner gives a complete range of temperature, from a gentle current of warm air to a clear red heat, and is so perfectly under control, that a common glass bottle may be placed on the tripod and heated to any required temperature without the slightest risk of fracture. In practice it dispenses with drying closets, sand and water baths, etc., and is equally well adapted for drying, evaporating, boiling, and general purposes. For very low temperatures the ring must be lighted through the opening B. This gives a steady current of

heated air through the gauze above. For boiling, etc., the light must be applied on the surface of the gauze, thereby providing a large body of blue flame, which can be urged by the blast pipe C. This is one of the most generally useful burners, and stands hard dirty work without injury. The gauze if choked up with dirt can be replaced in a few seconds.

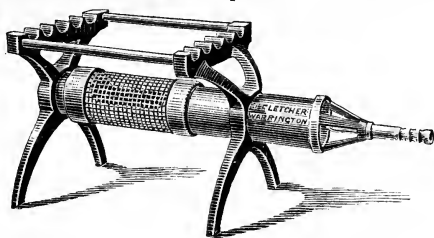
PRICE.

No. 7, Low Temperature Burner, with blast pipe C, . . . \$2.00
No. 7, Low Temperature Burner, without blast pipe C, . . . 1.75

No. 45. FLETCHER'S HORIZONTAL SOLID FLAME BURNER.

—The special points about this burner are the enormous power of the flame, which at the same time is under far more perfect control than an ordinary Bunsen; the lowness and steadiness of the stand, and the ease with which the burner can be cleaned after the dirtiest work. It is in every way a most perfect burner for laboratory use, cooking, small engines, &c.

The flame being solid, requires no external air supply, and it is as easy to make a perfectly solid flame a foot or more in diameter as to make the smallest. The gauze is fastened only by loose rings, which, in case of an accident, can be slipped back, and a new sheet of gauze put in in a few seconds. by any accident.



No. 45.

No other part of the burner can be damaged

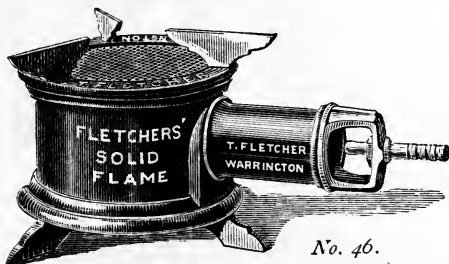
To get the greatest power from this burner, it is necessary that the gas pipe and taps shall be as large and clear as possible, and any India-rubber tubing used must be smooth inside, so as to give the greatest possible gas pressure at the point of the jet. Three sizes of this Burner are made:

PRICE.

No. 45. Horizontal Solid Flame Burner—A, diameter $1\frac{1}{2}$ inch,	\$2.00
No. 45. Horizontal Solid Flame Burner—B, diameter 2 inches,	2.50
No. 45. Horizontal Solid Flame Burner—C, diameter $2\frac{1}{2}$ inches,	3.00

Nos. 46 and 46b. FLETCHER'S SOLID FLAME BURNERS.

—The flame is *solid* and the same temperature throughout; the usual heating burners having a flame with a hollow center of unconsumed gas.



No. 46.



No. 46b.

It is THE ONLY BURNER PERFECTLY FREE FROM SMELL, and is simple, strong, cheap, and of a power and adaptability unapproached by any known burner.

The new burner measuring only five inches in total height (four times the size of engraving), will with equal ease boil an egg in a small tin sauce-pan, or melt half a hundred weight of lead in an iron pot. It will boil half a gallon of water in a flat copper kettle in five minutes, and will melt 6 lbs. of lead or solder, in an iron ladle, in seven minutes.

The range of power of this burner is so great that one size only is made.

No. 46b.—In this the injecting tube is placed outside the body of the burner, reducing the height to 4 inches, and placing the gas jet further away from the flame, so as to prevent liability to burn the india-rubber tubing. Power the same as former pattern. Both will be kept in stock for the present.

NOTE.—Keep the gauze clean, use india-rubber tubing smooth inside, and if a very powerful flame is required, the gas tap must have a large way through. The burner works perfectly with any gas supply, small or large.

PRICE.

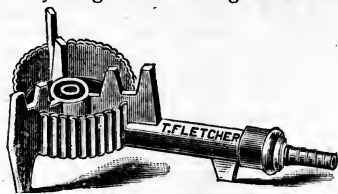
No. 46 or 46b. Solid Flame Burner, (Nickel-plated),	\$2.00
Extra gauze tops, each,	.25

Nos. 200 and 201. FLETCHER'S ARGAND BUNSEN.—

A cheap, simple and indestructible burner for general laboratory work. The flame of these burners is shorter, more compact, and higher in temperature than an ordinary Bunsen, and is also free from smell. The air supply is self-adjusting. The sizes given are the bore of the horizontal tube.



No. 200.



PRICES.

No. 201.

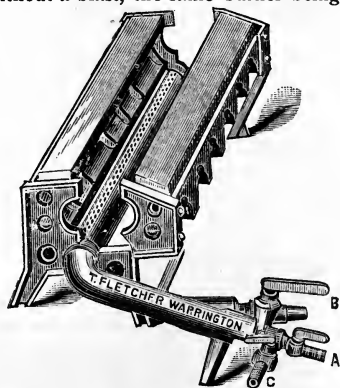
		Without Tripod.	With Tripod.
$\frac{3}{8}$ -in. size, gas consumption	2 ft. per hour,	No. 200, \$0.75	No. 201, \$1.00
$\frac{1}{2}$ -in. " " " "	$3\frac{1}{2}$ " " "	" 1.00	" 1.25
$\frac{3}{4}$ -in. " " " "	7 " " "	" 1.25	" 1.50

FLETCHER'S TUBE FURNACE.—This will heat an iron

tube $\frac{3}{4}$ to $1\frac{1}{4}$ -inch diameter to its softening point in ten minutes, using a small foot-blower; or it will heat the same tube to redness without a blast, the same burner being applicable for either draft or blast.

To use as a Draft Furnace, connect the tap A with the gas supply, closing both the other taps.

As a Blast Furnace, connect B to a second gas supply, full $\frac{1}{2}$ -inch bore, and connect C to a foot-blower. When the blast is applied the tap A must be closed and the gas supplied only from B. In the pattern, with the adjustable length of flame, at the side of A is a screw plug which adjusts the area of the gas jet without affecting the pressure of gas. The gas supply when used without a foot-blower must be adjusted by this plug only, and not with the tap, which must be full on. This plug adjusts the gas supply for varying lengths of flame, the length of the flame on the tube being altered by a sliding plug in the tube, enabling the combustion tube to be heated from one inch upward. The above can be used with air gas or coal gas. The foot-blower No. 9a New Pattern is best for the furnace.



Engraving shows the Furnace open ready for the introduction of a tube.

PRICES.

	12-inch.	18-inch.	24-inch.
For draft or blast, with adjustable flame length,	\$15.00	\$20.00	\$25.00
As above, without adjustable length of flame,	12.00	17.00	22.00
With fixed length of flame, without blast,	10.00	15.00	20.00

No. 111. NEW PATTERN GAS SUPPLY TAPS for fur-

nace and general work, with quadrant and pointer to regulate exact quantities of gas supplied. This Tap requires no gasfitter. Screw the plate to the wall or bench, cut off or unscrew the old tap, and connect to the supply pipe with a short length of India-rubber tube.

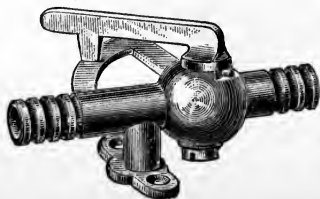
PRICE.

No. 111, with $\frac{3}{8}$ -inch clear bore, . . .	\$0.90
No. 111, with $\frac{1}{2}$ -inch clear bore, . . .	1.10

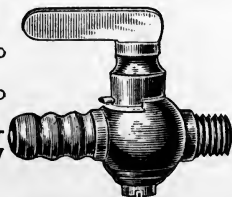
No. 114. For attaching to gas pipes by means of a thimble.

PRICE.

No. 114. $\frac{3}{8}$ -inch clear bore,	\$0.75	No. 114.
No. 114. $\frac{1}{2}$ -inch clear bore,	0.95	



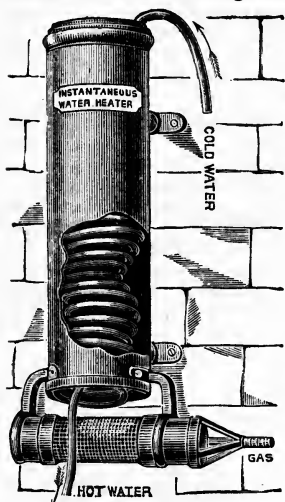
No. 111.



No. 114.

No. 147. FLETCHER'S INSTANTANEOUS WATER HEATER.

—Giving instantly a continuous supply of *pure* water, free from the products of combustion, and suited for all purposes. Designed to hang over a lavatory bowl or sink. Height, 24 inches; total projection from wall, 6 inches.



INSTRUCTIONS.—Connect the upper pipe to a water tap, apply a light to the gauze burner, then turn the gas on, and immediately afterwards the water. The speed at which the water runs rules its temperature. It will heat 1 pint of water per minute from 50 deg. to 130 deg. Fahrenheit, or will boil 15 quarts per hour. It is not designed for baths, being too small to heat a large bath efficiently, but is specially intended for lavatory purposes and the general odd work of laboratories, refreshment rooms, railway stations, lavatories, and general domestic purposes, where hot water is constantly wanted quickly. The gas supply should be $\frac{1}{2}$ -inch pipe, and if india-rubber tubing is used to connect, it must be smooth inside. It will work equally well, but at a proportionately slower rate with ANY gas supply, however small.

The engraving shows part of the casing removed, so as to show the internal arrangement.

NOTE.—The light must be applied to the gauze before the gas is turned on.

PRICE.

No. 147. Instantaneous Water Heater, small size,	. . .	\$10.00
No. 147. Instantaneous Water Heater, large size,	. . .	13.00
If nickel-plated, \$2.50 extra.		

No. 247. FLETCHER'S NEW INSTANTANEOUS WATER HEATER.

—FOR LAVATORY, SCULLERY, WORKSHOP, AND COOKING PURPOSES. An attachment to Fletcher's Patent Cooking Burner, No. 47. Total height, 9 inches.

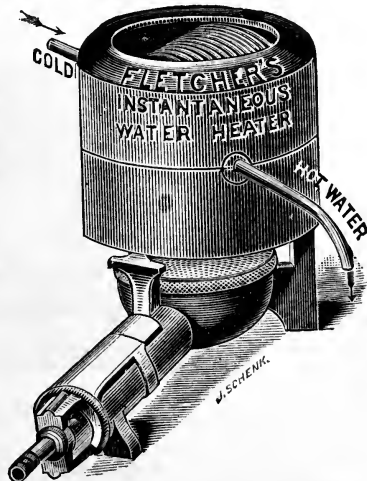
This gives, when connected with a cistern or water tap, hot water in three seconds after the gas is lighted, either boiling, hot, warm, or cold, the water being pure, and fit for cooking purposes. It will deliver sufficient hot water for washing hands in one minute, and, giving a stream at any temperature, steadily and instantly, when required, it will be found particularly valuable for many workshop purposes, washing crockery, public lavatories, &c. It is simple, cheap, not liable to get out of order or wear out, and is equal in power to the small-size Instantaneous Water Heater above. Gas supply required, $\frac{3}{8}$ clear bore pipe and tap, to obtain the maximum power. It will work at a proportionate rate with any gas supply, however small.

It may be attached permanently to the cold water tap, as cold water can be obtained through it, just as readily as hot, if the gas is not lighted, and therefore it requires no fixing, and may be connected permanently with the ordinary cold water tap with an india-rubber tube.

If frequently used for long periods in a confined room the products of combustion should be carried away, as all Instantaneous Water Heaters vitiate the air rapidly.

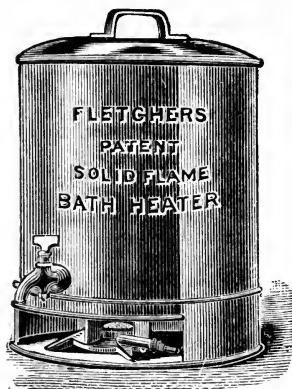
PRICE.

No. 247. Instantaneous Water Heater, without burner, in nickel-plated case,	\$3.00
With burner, (No. 47) complete, as engraved,	5.00



No. 247.

FLETCHER'S PATENT SOLID FLAME BATH HEATER.—This consists of a strong galvanized tank 14 inches in diameter and 20 inches high. The heat is obtained by the solid flame burner No. 48.



HEATER, ONE-TWELFTH FULL SIZE.

By turning the gas down so that a small flame is obtained, the heater can be kept ready for instant use, day and night, in hospitals, or in case of sickness, at a cost of a few cents for twelve hours.

INSTRUCTIONS.—Fill the cistern (about 7 gallons) with water, remove the burner, light it, and replace it in the recess under the cistern. If lighted in position it is liable to light back at the jet inside the tube, and make a smell. See that the gas does *not* burn inside the burner tube. For a child's bath half fill the cistern; this will be ready in about half an hour. For a full-size bath it will be ready in two hours, and will keep hot two hours after the gas is turned out, or the gas, if required, may be turned low. When wanted, open the tap and run the water into the bath. The apparatus can stand on a shelf in a corner, or can be made to fit any recess.

It will supply sufficient hot water to make a 30 gallon warm bath in 2 to 2½ hours.

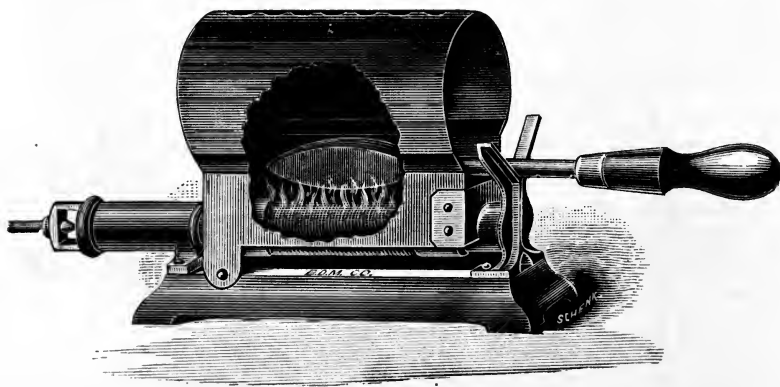
PRICE.

Complete, in strong galvanized iron, \$10.00

Larger sizes for hospital use made to order, in galvanized iron or copper.

A small pattern in copper is now in hand for use in Lavatories, Sculleries and for Hairdressers' use. The stock pattern will hold two gallons; but any size can be made to order.

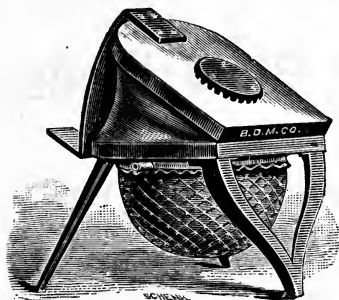
No. 18. NEW SOLDERING IRON HEATER.—This heater has been recently remodeled, and is now constructed on the principle of the efficient Fletcher Solid Flame Burner. It is a simple and strong arrangement requiring no more gas than an ordinary lighting burner.



This heater is extensively used by tinsmiths, plumbers, electrotypers, etc., etc. It is particularly useful to plumbers, dispensing with the annoyance and trouble of carrying furnace and coals in doing work outside of the shop. It can be carried in the kit, and attached to any gas burner in the house where they may be employed. The heater is wide enough to accommodate two ordinary size soldering bits, which can be used alternately.

PRICE, with dome for economizing heat, \$1.75

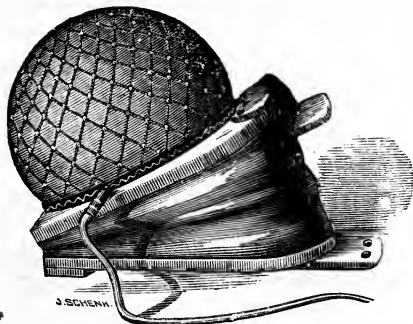
Foot Blowers.



No. 9. FOOT BLOWER—NEW PATTERN.—This pattern, by reversing the position of the blower, does away with the risk of mechanical injury to the disc, and obviates the necessity for a wood casing or protection. It also prevents the valve from picking up dirt from the floor, keeping the whole arrangement cleaner, and the valves in more perfect order. Sizes as Fig. 9.

PRICES.

No. 9, Foot Blower, new pattern, .	\$5.00
No. 9a, Foot Blower, new pattern, .	6.00
No. 9b, Foot Blower, new pattern, .	8.00



No. 9.

No. 9. FOOT BLOWER.—This is a simple, compact and powerful arrangement. The step for the foot is very low and enables the blower to be used with ease whether the operator is standing or seated. The pressure is perfectly steady and equal. If the rubber disc is distended until forced against the net, the pressure can be increased to almost any extent desired. It will give, if required, a heavy and continuous blast through a pipe of $\frac{1}{4}$ inch clear bore. Three sizes of this Foot Blower are in stock.

PRICES.

No. 9, Foot Blower,	\$4.00
No. 9a, " " " " " " " "	5.00
No. 9b, " " " " " " " "	7.00
Extra rubber discs for No. 9, each, .50	
" " " " " " " " No. 9a, " " .75	
" " " " " " " " No. 9b, " " 1.00	
Extra nets, each, . . . . .	.50

No. 9b, (price, \$7.00,) is sent out with the No. 41 B and C Petroleum Furnaces.

These Blowers are supplied with the reservoir separated, to hang up out of the way of mechanical injury, as shown in cut. A great advantage is obtained in blow-pipe work by attaching a stop-cock to the air-pipe, thereby controlling the blast as with the mouth. Stop-cocks furnished for this purpose at a cost of \$1.00.

PRICES—Suspended reservoir,	\$2.00
Bellows to operate the same,	3.00

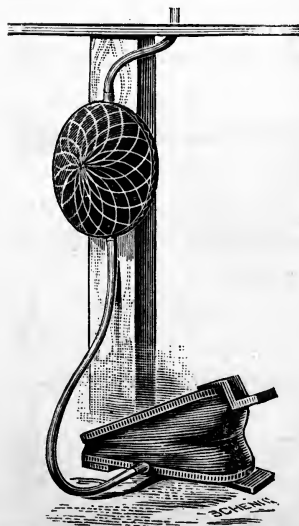
THESE ARE THE ONLY BLOWERS IN EXISTENCE GIVING ABSOLUTELY STEADY AIR PRESSURES IN ALL POSITIONS.

MOLDED CARBON BLOCKS

for supporting work under the blow-pipe. Cleanly, perfect non-conductors, and everlasting. These are circular, hollow on each face, and 4 inches diameter. Price, 50 cts. each.

INDIA RUBBER TUBING

for gas and blast connections, all sizes. All tubing is extra, and is not furnished with the apparatus, unless specially ordered.



FLETCHER'S

Hot and Cold Blast Blow-Pipes.

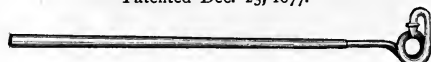
FLETCHER'S HOT BLAST MOUTH BLOW-PIPE.—

FOR CANDLE, LAMP OR GAS.—The results obtained with this blow-pipe are such that there is little doubt it will eventually totally supercede the ordinary form for every purpose. It not only gives temperatures never approached with the old blow-pipe, but it is in every respect more convenient, easier to use, and better adapted for every class of work. With the same amount of blowing as with the common form, this blow-pipe will do nearly double the work; if high temperatures are not required, the labor of blowing is reduced in proportion. The improvement consists in coiling the air tube into a light spiral *over the point of the jet*. This coil takes up the heat which would otherwise be wasted, and utilizes it by heating the air in its passage.

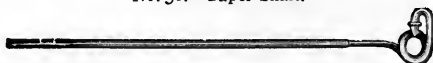
No. 30. FLETCHER'S HOT BLAST MOUTH BLOW-PIPE. Specially designed for

Jewelers, Dentists, Plumbers, etc. This has nearly double the power of the old mouth blow-pipe. Two patterns of this blow-pipe are manufactured, taper shaft and straight shaft.

Patented Dec. 25, 1877.



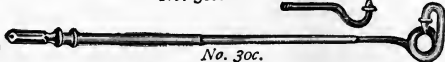
No. 30. Taper Shaft.



No. 30a. Straight Shaft.



No. 30b.



No. 30c.

PRICES.

No. 30. Taper Shaft, brass, . \$0.65

No. 30a. Straight Shaft, . . .55

No. 30b. Straight Shaft, with hard rubber mouth-piece, . .65

No. 30c. Folding in case $5\frac{1}{2} \times 1\frac{1}{4} \times \frac{1}{2}$ in., with both hot and cold blast jets, . . .1.00

No. 31. FLETCHER'S HOT BLAST CHEMICAL BLOW-PIPE.—A pattern of the ordi-

nary chemical blow-pipe with the patent hot blast arrangement. Hard rubber mouth-piece. This can also be supplied with Major Ross' trumpet mouth-piece at same price. Jets No. 65 size, unless otherwise ordered.

No. 31. Patented Dec. 25, 1877.

PRICE.—No. 31. Chemical Blow-pipe, . . . \$1.25

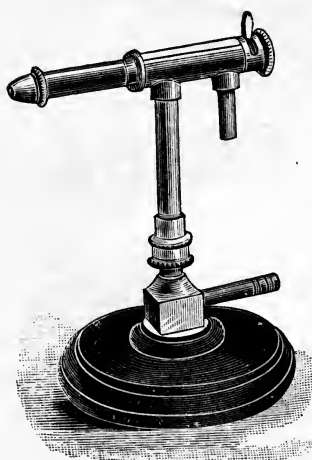
No. 31b. Folding in case $5\frac{1}{2} \times 2 \times 1\frac{1}{2}$ in., with both hot and cold blast jets, and two mouth-pieces.

PRICE, . . . \$1.75



No. 31b.

Any of the above blow-pipes, nickel-plated, 20 cents extra.



AUTOMATON BLOW-PIPE—A.

THE AUTOMATON BLOW-PIPE A is as perfect in its way as the Injector Furnace, combining in the simplest possible form every quality essential to a perfect blowpipe, and forming what is believed will become the standard and universal pattern for all purposes.

This blowpipe is mounted on a stand, with a universal ball joint, so as to enable it to be used at any angle or in any position. The ball joint can be secured fast in position.

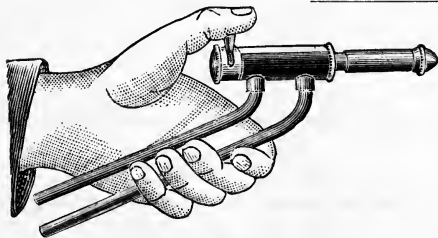
It is simple, self-adjusting for both gas and air, requiring only a slight motion of a small lever to obtain instantly any flame, from the smallest to the largest.

It has all the delicacy of the best mouth blowpipe used with the utmost skill, with the power and advantages obtained with a mechanical blower.

A slight motion from side to side of the pin A changes the power and character of the flame instantly as required, or stops the power without extinguishing the flame, the blowpipe being both self-lighting and self-adjusting.

PRICE.

Automaton Blowpipe on stand, as engraved, for jets not exceeding $\frac{1}{8}$ inch bore, complete with one jet (No. 55 sent unless otherwise ordered),	\$4.00
Extra jet, any size to $\frac{1}{8}$ -inch bore,	.10



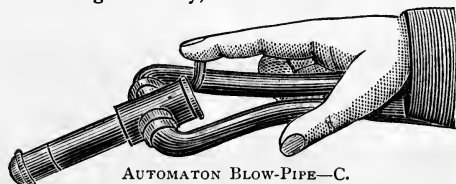
AUTOMATON BLOW-PIPE—B.

AUTOMATON HAND BLOWPIPE B. The engraving showing the hand blowpipe, with both tubes underneath, will be found the most convenient pattern for small work, brazing, annealing, etc.

PRICE.

Automaton Hand Blowpipe.	\$3.50
Extra jet, any size to $\frac{1}{8}$ -in. bore,	.10

AUTOMATON HAND BLOW-PIPE C with side tubes is made in large size only, as the most convenient form of heavy work. The size requires



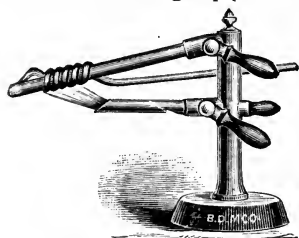
AUTOMATON BLOW-PIPE—C.

for its fullest power a $\frac{3}{8}$ -inch clear bore gas pipe and tap, and is adapted for the heaviest brass finishers' and bicycle-makers' work.

NOTE.—It is absolutely necessary, in ordering any blow-pipe, that the size or bore of air jet generally used shall be clearly stated, or that the work to be done shall

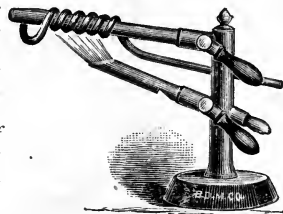
be distinctly specified. There is always a great difficulty in supplying blow-pipes precisely to the requirements and ideas of users, unless their requirements are fully understood; and blow-pipes are frequently condemned when the fault is entirely with the purchaser, who does not state his exact requirements or his business. A blow-pipe should never be ordered unless the fullest information is supplied with the order, so that the proper size can be sent. The power of a blowpipe depends not only on the size of air jet and gas supply, but on the *pressure* of the air supplied by the blower. The foot-blowers Fig. 9 and 9b are so perfect for all blowpipe work as to leave nothing to be desired. After ten years they remain beyond the possibility of improvement in the slightest detail, unapproached by any other form. The Automaton Blowpipes A and B require Blower No. 9. Automaton Blowpipe C requires Blower No. 9b. For Blowers, see page 9. **PRICE**—Automatic Blowpipe C, \$4.00.

No. 1a. FLETCHER'S ORIGINAL HOT BLAST BLOW-PIPE, (simplified form) for temperatures above the power of ordinary gas and air blow-pipes. As it will be seen from the engraving, the air pipe is coiled round the gas pipe in a spiral form and both are heated by a small Bunsen burner underneath, which is controlled by a separate stop-cock. The



No. 1a.

power of this arrangement is about double that of an ordinary blow-pipe; and *when the jet is turned down to a small point of flame it will readily fuse a moderately thick platinum wire.* In power it is nearly equal to the oxy-hydrogen



No. 2a.

jet, and it is a good arrangement both for chemical purposes and also for soldering and general use. This form of blow-pipe is not designed for large work; for this purpose No. 8a and 8c are preferable. For small work it is the best gas blow-pipe ever constructed. For a large rough flame the Bunsen burner should not be used. The advantage of the hot blast shows only when a pointed flame is required having a high temperature.

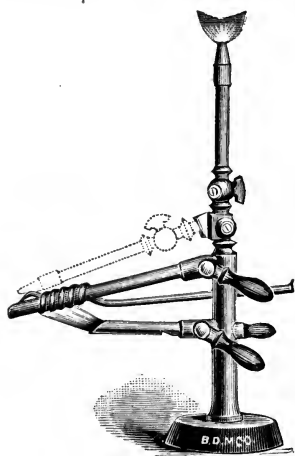
PRICE.

No. 1a, Hot Blast Blow-pipe, . . . \$5.00
With Fletcher's new Mouth-piece, 60 cts. extra.

No. 2a. HOT BLAST BLOW-PIPE.—Same construction as No. 1a, but with upright jet.

PRICE.

No. 2a, Hot Blast Blow-pipe, . . . \$6.00
With Fletcher's new Mouth-piece, 60 cts. extra.



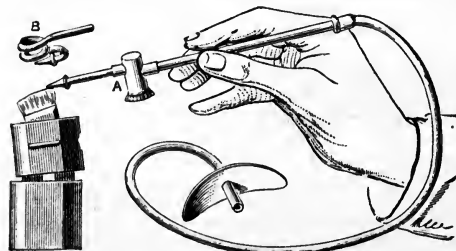
No. 3a.

No. 3a. HOT BLAST BLOW-PIPE.—Constructed on the same principle as No. 1a, but with bench light arranged to swivel so as to carry a light to the blow-pipe jet.

PRICE.

No. 3a, Hot Blast Blow-pipe, . . . \$7.00
With Fletcher's new Mouth-piece, 60 cts. extra.

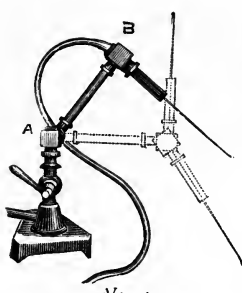
No. 42. FLETCHER'S NEW PATENT BLOW-PIPE.
—The whole arrangement of this is totally different from that of any blowpipe yet made. The ordinary form has been entirely discarded, and every detail has been specially designed from practical experience as to the requirements of all users. The mouth-piece is of all, the easiest to use, and the heaviest continued blowing causes no strain on the lips, whilst the tongue has the necessary control over the opening.



The Blowpipe proper is held as a pencil, the chamber on the stem stops all condensed moisture, and prevents the heat traveling up to the end.

The Blowpipe proper is held as a pencil, the chamber on the stem stops all condensed moisture, and prevents the heat traveling up to the end.

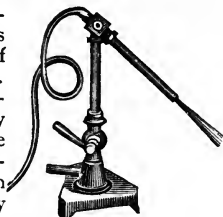
PRICE.—With both cold blast and patent hot blast, two jets, nickel plated mouth-piece in case, \$1.50; mouth-piece alone, for use with other blowpipes, 60 cents.



No. 4.

No. 4. IMPROVED HERAPATH BLOW-PIPE.

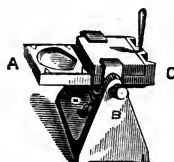
— For general use. This is a modification of the well-known Herapath, from which it differs in its great simplicity, and in its power of adjustment in any possible position. The jet tube may be raised or lowered to any height, and turned in any direction. A touch will direct the flame on any point while the blow-pipe stands in the same position on the table; there being no necessity for raising, lowering, or adjusting work before it.



No. 4b.

PRICE.

No. 4, Improved Herapath Blow-pipe,	\$3.75
No. 4b, Improved Herapath Blow-pipe, without the joint A,	3.00
With Fletcher's new Mouth-piece, (see No. 42), extra, . . . . .	.60



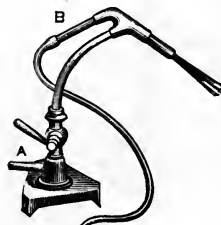
No. 8.

No. 8. MELTING ARRANGEMENT.

For obtaining Ingots of Gold, Silver, etc., rapidly without the use of a furnace. Reference to engraving: A, Crucible of moulded carbon supported in position by an iron side plate. C, Ingot mould. D, Clamp holding crucible and Ingot mould in position, and swivelling on the cast-iron stand B. The metal to be melted is placed in the crucible A, and the flame of a blow-pipe is directed on it until it is perfectly fused. The waste heat serves to make the Ingot mould hot, and the whole is tilted over by means of the upright handle at the back of the mould. A sound Ingot may be obtained at any time in about two minutes.

PRICE.

Melting Arrangement, with both wire and plate moulds,	\$3.25
Stand for Melting Arrangement, . . . . .	.75
Wire Moulds,	1.25
Plate Moulds,	1.25
Extra carbon crucibles, without slides, per doz.,	1.00
Extra carbon crucibles, with slides, per doz.,	1.75



No. 8a.

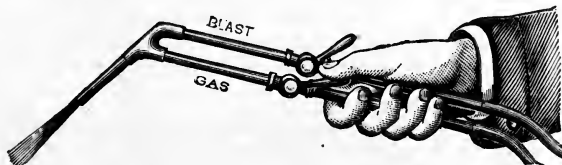
No. 8a. BLOW-PIPE.—Specially designed for use with the above Ingot mould. The air jet is $\frac{1}{8}$ inch bore and requires a supply from a foot-blower.

PRICE—No. 8a, Blow-pipe, \$2.25

No. 8c. BRAZING BLOW-PIPE.—A modified form of 8a for use in the hand for brazing work requiring great heating power. The stop-cocks are both under perfect control of the thumb of the hand which holds the blow-pipe. The air jet is $\frac{1}{8}$ inch bore and requires a supply from a foot blower.

PRICE.

No. 8c, Brazing Blow-pipe, with two lever stop-cocks, as in engraving,	\$3.50
No. 8c, Brazing Blow-pipe, without stop-cocks,	\$2.50

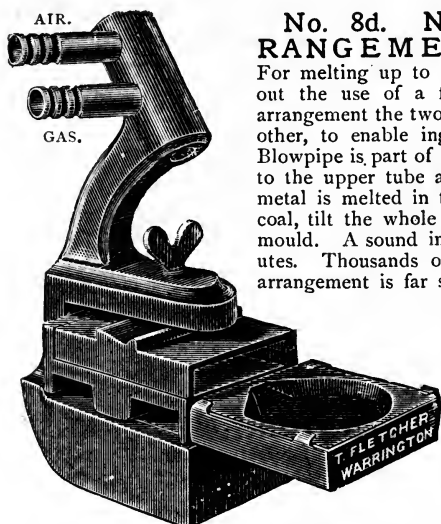


BLOW-PIPE JET TIPS for No. 4, No. 4b, and all mouth blow-pipes. These jet tips screw on, and any size can be supplied.

70	65	60	55	50
•	•	•	•	•
BORE OF JETS. Stubbs Steel Wire Gauge.				

PRICE.

Blow-pipe jet tips, brass, each,	10 cts.
Blow-pipe jet tips, platinum, each,	25 cts.



Engraving slightly under half size.

No. 8d. NEW MELTING ARRANGEMENT.—(Improvement on No. 8.)

For melting up to 3 ounces of gold or silver rapidly, without the use of a furnace. For coal gas only. In this arrangement the two parts of the ingot mould slide on each other, to enable ingots of any width to be cast, and the Blowpipe is part of the rocking stand. Connect the blower to the upper tube and the gas to the lower. When the metal is melted in the shallow crucible of compressed charcoal, tilt the whole apparatus over so as to fill the ingot mould. A sound ingot can be obtained in about two minutes. Thousands of the old pattern are in use, and this arrangement is far superior to any furnace for small work.

Very bulky scrap should be run into a mass in one of the moulded carbon blocks before being placed in the crucible. No flux must be used with the carbon crucibles.

PRICE.

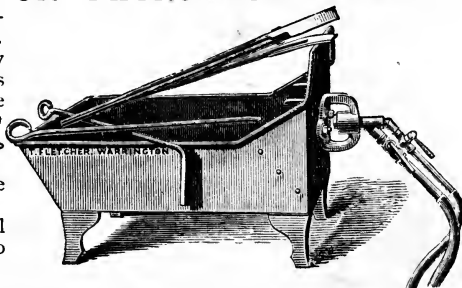
No. 8d. Melting Arrangement,
complete, \$3.00
Extra Carbon Crucibles, per doz., 1.75

FLETCHER'S GAS OR PETROLEUM FORGE.—

As used at Woolwich Arsenal, England. Invaluable for small forgings. Size of hearth, 15x18 inches. By this simple arrangement, steel tools can be forged without injury, by the use of gas. It will be found a perfect arrangement for **Small Forgings and Repairs.**

It is perfectly clean. No nuisance either in lighting or use.

Starting all cold, a slide rest tool can be repaired or shaped in two minutes.

**INSTRUCTIONS.**

Fill the hearth with coke, broken small, (cinders may be used, but are not so clean); light the gas at the blowpipe, and use the blower. In a minute turn the gas out, and then turn on again a *very small quantity, not enough to burn at the blowpipe jet*, but sufficiently to visibly brighten the fire. When the heat is obtained, the forge may be worked with or without gas, but a little gas doubles the power. **THE GAS MUST NOT BURN AT THE BLOWPIPE JET, EXCEPT FOR THE FIRST MINUTE.** If gas is not available, the vapor from the Gasoline Generator may be used precisely in the same way as gas. If a hood is required, it will be furnished at \$1.50 extra. It is not usually necessary if coke is used.

Foot Blower No. 9b should be used with this forge.

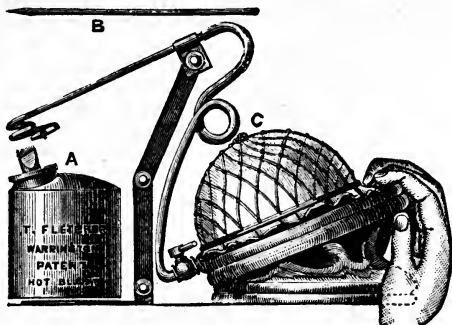
The Blowpipe used in this forge is the ordinary pattern, Fig. 8e, and can be removed for use as a blowpipe, making the whole apparatus complete for all small heating and brazing work.

PRICES.

Foot Blower, No. 9b, new pattern,	\$8.00
Blowpipe, No. 8e,	4.50
Hearth,	4.50
6 ft. Gray India Rubber Tubing,	1.00
Forge complete, with Foot Blower, Blowpipe, etc.,	18.00

No. 32. FLETCHER'S SPECIAL CHEMICAL BLOW-PIPE, with folding stand, adjustable at any height or angle. It can be used either with the mouth, or the small hand blower can be attached and the blowing done by the finger. With this Blow-pipe is supplied one jet with, and one without, the patent coil, to enable a larger variety of flame to be obtained. The lamp or a weight should be placed on the stand when in use.

PRICE. . . . \$1.00



HAND BLOWER, as

shown in No. 32. This is a very small copy of the foot blower which is now so well known. When not in use it shuts up flat for the pocket. The pressure of air is adjusted by a delicate lever tap on the air tube. This will be found a great improvement on the mouth for blowing; a steady blast can be kept up for any length of time by the pressure of the finger, or by squeezing in the hand. PRICE, \$3.00. In case for travelers with spare rubber discs, \$3.25.

Hand Blower and Chemical Blow-pipe, complete in case ($5\frac{1}{4}$ by $4\frac{1}{4}$ by $1\frac{1}{4}$ inches outside measure) for the pocket. PRICE, \$4.00.

FLETCHER'S IMPROVED BLOW-PIPE LAMP.—The

wick holder will be found one of the best forms ever made, in addition to the fact that the angle can be adjusted as required by simply revolving it in the fixed collar. The wick holder lifts out for refilling. Lamp engraved half size.

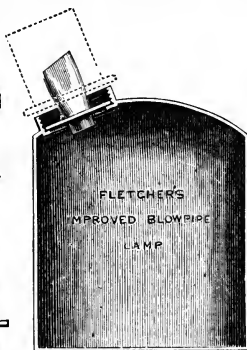
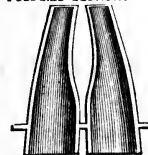
PRICE.

Blow-pipe Lamp, polished brass, . \$.75
Blow-pipe Lamp, nickel plated, . 1.00
Blow-pipe Lamp, for tallow, . .30

WICK HOLDER TURNED
HALF A REVOLUTION.

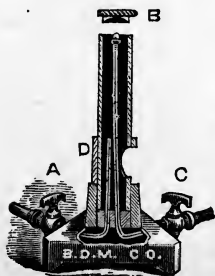


WICK HOLDER END VIEW
FULL SIZE SECTION.



A modified form of this lamp is made for tallow or solid fats for traveling. When tallow, etc., is used, an operation must be commenced by first blowing the flame downwards to melt the solid fat round the wick. The heat of the flame

will keep it fused afterwards for any length of time. This pattern can be used with solid or liquid fats of any kind, and is a perfect traveler's lamp. Size when closed, 2 in. by 2 in. Trim the wick always while the lamp is hot, when hard fats are used. The curved bottom of the lamp should stand on the open end of the cover when in use. This makes a steady base and admits of adjustment of the angle of wick without reversing or re-trimming.



No. 5.

No. 5. FLETCHER'S BLAST BUNSEN

for high temperatures. This is a Bunsen combined with a powerful blow-pipe, and is one of the most generally useful arrangements known for the chemical laboratory. The blow-pipe flame obtained with the blast tube, when confined by the loose cap B, is compact and extremely powerful owing to the fact that the air mixture is partially made before the blast begins to act. When the object to be heated is fragile it can be warmed by the Bunsen flame and the blast slowly turned on by the tap C. The convenience of having a powerful flame at command under an ordinary retort stand without the necessity of re-adjusting the height or position will be fully appreciated.

PRICE.

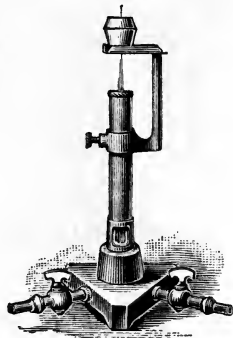
No. 5. Blast Bunsen Burner, \$3.50

FLETCHER-PLATTNER BLOW-PIPE FURNACE, FOR CAPSULES, OR CRUCIBLES.— $\frac{3}{4}$ -inch diameter. This is made of Fletcher's Patent Non-conductor, which does not require renewing, and does not require the objectionable wire support of Plattner's pattern, which generally fails at the most critical moment. This pattern, like that of Plattner, has the hole for the blow-pipe flame at the side; but if the hole is at the bottom, and an upright blow-pipe is used, the improvement is very great. With the blast Bunsen No. 5, as shown in the cut, and a good foot blower, 100 grains of cast iron can be perfectly fused in two minutes; the temperatures being, at the same time, under the most perfect control.

PRICE.

Blow-pipe Furnace, with bottom or side hole, and one crucible	\$0.30
Blow-pipe Furnace with blast Bunsen, taps for gas and air, and furnace support, without blower, as per cut,	4.25
Clay Crucibles, per doz., . . . . .	.60
Clay Capsules, per doz., . . . . .	.50
Furnace Support, . . . . .	.65

For Blowers, see page 9.



TAPS FOR GAS should be what are known as main cocks, with a large way through. These we can supply, with nozzle for India-rubber tubing $\frac{3}{8}$, or $\frac{1}{2}$ -inch bore. For the small heating burners, ordinary taps will do if the way through is good and clear, but high powers must not be expected with a deficient gas supply.

IT IS A GREAT ADVANTAGE in all gas furnaces if the gas supply tap and pipe are large and clear, so as to give as great a pressure of gas as possible at the burner nozzle.

Gas Furnaces without Blast.

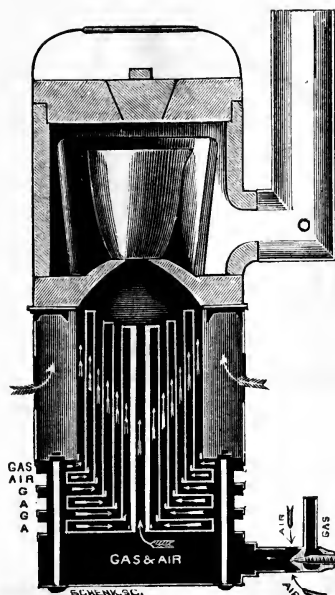
FLETCHER'S UNIVERSAL FURNACE for high temperatures, requiring neither blast nor attention. Of these furnaces thousands are at present in use for chemical purposes, enamel burning, heating soldering irons, jewelers' and dentists' work, &c., and their use is being rapidly extended to all purposes where rapidity and certainty of results are required without trouble. These furnaces are made in two distinct types, one, No. 11 and 2, with a perforated dome over the crucible and muffles to attain the maximum heat; the other as in No. 15 and 16, with a side chimney and lid over the crucible. The power and rapidity of working depend in each case on the length of the chimney used. The pattern with side chimney, although more convenient in use, is slower in working.

DESCRIPTION OF BURNER.—These furnaces are supplied with an improved pattern of burner, which gives a number of concentric circular flames as does the multiple Argand burner, used in large lighthouses, and is illustrated in the cut of the No. 15 Furnaces.

The gas enters a chamber at the bottom of the burner through a device similar to a Bunsen burner, mixing with air as it enters, and is burned at the upper ends of a series of concentric tubes, furnishing air-spaces alternately with those supplying the mixture of gas and air. The whole burner is constructed of iron, and will be found better able to withstand an intense heat, more durable, and quicker in its operation than the old pattern, with gun-metal tubes. In case metal should be spilled into the burner, it can be easily taken apart for its removal.

Each part of the burner is lettered, and in case of accident, it can be supplied at a small expense, by specifying the letter on the piece desired.

Mr. Fletcher has recently perfected a new pattern of burner (see page 20) which will work all the draft furnaces described in this section—and which will be furnished, if desired, in place of the regular concentric flame burner.



No. 15.

No. 15. CRUCIBLE FURNACE.

—This will take crucibles up to $4 \times 3\frac{1}{2}$ inches and with $\frac{1}{2}$ -inch gas pipe, and a pressure of gas equal to 2 inches of water, supplying about 50 feet per hour, will melt 3 or 4 lbs. of brass in about 30 minutes, and the same quantity of cast-iron in about 60 minutes from the time the gas is first lighted. It will melt a crucible full of silver or gold in 30 minutes. The crucible will hold and melt about 6 lbs. when quite full. It is made in a very substantial manner, and is recommended as a first-rate furnace for manufacturing jewelers, reducing photo. waste, &c. In using this pattern of furnace, the narrow end of the plumbago cylinder which surrounds the crucible is always put downwards. The use of this cylinder is to keep the flame in contact with the crucible up to the top. The flame is then deflected by striking against the lid and, turning downwards, leaves the furnace by the chimney at the lower side.

The lid never gets very hot, and can be lifted away by the handle across the top; it is now made of the patent non-conducting material, in one piece, with an opening in the centre for convenience in examining work.

DIRECTIONS.

When the burner is first lighted, the milled handle at the gas-entrance *must be turned on completely*, and the gas should be turned on full head. After it is lighted the gas should be partially turned off by screwing in the regulator at the gas entrance until no blue flame is visible at the hole in the elbow of the chimney. After the furnace has been lighted one or two minutes, and becomes hot, the flame will, and should, be seen through the hole in the chimney-elbow. When the proper adjustment is made, and the gas burns satisfactorily, a re-adjustment may be avoided by turning off the gas at the main when the operation is completed. To secure the best results, use at least six feet of chimney pipe, and if it can be connected with a chimney flue, so much the better; the better the draft, the better the furnace will work. The gas should be supplied from a half-inch tap, and the rubber tubing used should be not less than half-inch bore.

Attention should be given to the proper regulation of the gas supply. If too much is used, the gas is partly wasted and the chimney becomes red hot; if too little, the proper duty cannot be obtained.

To take the burner apart, remove the top plate and the sheet iron casing, then unscrew the three bolts, after which the parts of the burner can be easily separated.

In putting the burner together care should be taken to get the circular openings through which the bolt passes fair with each other, as they serve to conduct the gas from one section to the other.

The rings of wire gauze must be adjusted so as to be concentric with the burner, or an explosion will ensue when the gas is turned off.

PRICES.

No. 15, Crucible Furnace, complete, \$18.00

PRICES OF SEPARATE PARTS.

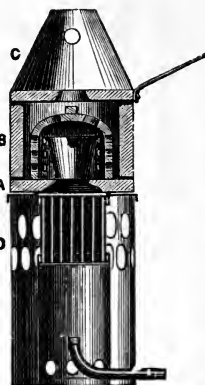
Plumbago Crucibles, No. 3, each,	\$.25
Plumbago Cylinders, . . . . .	.60
Crucible Tongs, 17 inch, . . . . .	.75
Crucible Tongs, 12 inch, . . . . .	.65
Fire clay casing,	3.00
Lid,	1.00
Grate,	1.00
Burner,	10.00

No. 11. SMALL LABORATORY FURNACE

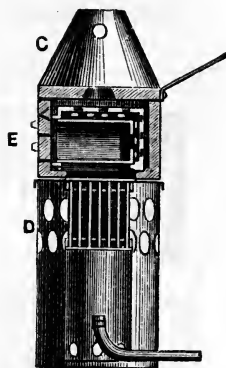
for crucibles. This takes crucibles up to $2\frac{1}{2}$ by $2\frac{1}{4}$ inches outside, and with a 6-ft. chimney, as supplied with the furnace, will melt copper, gold, silver, &c., in about ten minutes, or cast-iron in 30 minutes from the time the gas is lighted. Small muffle fittings E, No. 2, with muffles $2\frac{1}{4}$ by 3 by $2\frac{1}{2}$ inches inside, can be supplied with this furnace at an extra cost of \$7.00.

The burner is of the same construction as the No. 16.

This furnace can also be supplied with the new burner. See page 17.



No. 11.



No. 2.

PRICE.

No. 11, Small Laboratory Furnace,	\$12.00
No. 11, " " including muffle fittings (see No. 2),	19.00
Plumbago Domes, each,	60 cts.
Plumbago Crucibles, No. 0, each,	20 "
Crucible Tongs, 12 inch,	65 "

No. 16. SMALL CRUCIBLE FURNACE,

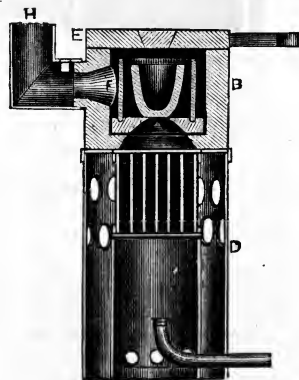
taking crucibles up to $2\frac{1}{2}$ by $2\frac{1}{4}$ inches outside. This pattern is more especially designed for gold, silver, copper, etc., and, as sent out, with 6 ft. chimney and single lid E, is amply powerful.

The burner is of the same construction as the new No. 15, but smaller.

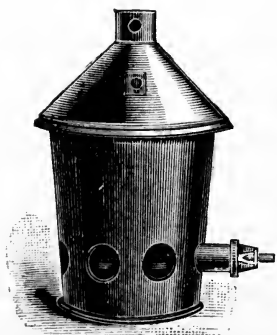
Reference is made to the description of that Furnace for full directions for operating the No. 16.

PRICE.

No. 16. Small Crucible Furnace, complete,	\$13.00
Extra Cylinders, each,	.25
Extra Grates, each,	.40



No. 16.



No. 14.

No. 14. PERFECTED LADLE FURNACE,

with Fletcher's new Solid Flame Heating Burner. This is a better ladle furnace in every respect than any yet made. The burner is simple, safe and works equally well with any gas supply available, giving proportionate speed of working. The worst possible accident to the burner can be remedied in a minute at the cost of a few cents. All other patterns of ladle furnaces are discontinued.

PRICE.

No. 14. Ladle Furnace,	\$5.00
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CRUCIBLE TONGS.— Malleable iron, a very neat pattern.

PRICES.

12 inch,	65 cts.
17 inch,	75 cts.

MUFFLE FURNACES

For assayers, enamelling, and all purposes where exact temperatures are required, not exceeding the fusing point of copper. The burners for these furnaces are of the same construction as the No. 15 Crucible Furnace.

Size No. 2. (See cut page 18.) Muffle $2\frac{3}{4} \times 3 \times 2\frac{1}{2}$ in. inside. Requires $\frac{1}{2}$ -inch bore gas pipe and tap.

Price, \$18.00

Extra Muffles, each, .75

Extra Muffle Domes, " .75

Size No. 3. Muffle, inside clear working space exclusive of neck $3 \times 4 \times 2\frac{1}{2}$ in. high. Requires $\frac{1}{2}$ -inch bore gas pipe. Chimneys 6 feet high are included in prices, extra chimney 20 cents per foot for all patterns of furnace, . . . Price, \$20.00

Extra Muffles, each, 1.00

Extra Muffle Domes, " 1.00

Size No. 4. Inside muffle space $3\frac{3}{4} \times 5 \times 3$ in. high. Requires $\frac{3}{8}$ -inch clear bore gas pipe and tap.

Price, \$25.00

Extra Muffles, each, 1.25

Extra Domes, " 1.25

Size No. 5. Inside muffle space $4\frac{1}{2} \times 7 \times 3\frac{3}{4}$ in. high. Gas supply as above. . . Price, \$35.00

Extra Muffles, each, 1.50

Extra Domes, " 1.50

Plumbago fittings and crucibles must be heated slowly the first time they are used.



Muffle Furnace. Size No. 3.

GENERAL INSTRUCTIONS

FOR FLETCHER'S GAS FURNACES WITHOUT BLAST.

A chimney or stove pipe 8 or 10 feet high may be used as a fixture, and the draught partially stopped with a damper or slide when lower temperatures are required, the gas being turned down in proportion; the guide for the proper adjustment being that UNDER ALL CIRCUMSTANCES THE FLAME MUST JUST COVER THE CRUCIBLE OR MUFFLE, but not extend into the chimney so as to make it red hot. When the flame covers the crucible or muffle the gas is doing its extreme duty under the most favorable circumstances, without waste. Particles of flux should not be allowed to fall on the fire-clay casing, where the parts touch each other; and the power of the furnace should not be urged too far by the use of very long chimneys, as there is danger of the fusion of the fire-clay parts together so that they cannot be separated. Fire-clay fittings, as a rule, cannot be safely used for temperature much exceeding the fusing point of cast iron. *Plumbago fittings and crucibles must be heated slowly the first time they are used.* After the first time they may be subjected instantly to the full power of the furnace without injury.

A $\frac{1}{2}$ -inch gas-pipe with a large tap is ample for melting cast-iron, with a moderately good gas pressure; but if a pipe has to be laid specially it is well to have a margin of power if required. Care should be taken not to spill any of the melted metal on the burners; but if an accident happens and damages the burner, extra parts may be obtained. They are all lettered for convenience in ordering duplicates.

THE FLAME MUST IN ALL CASES COVER THE CRUCIBLE OR MUFFLE TO OBTAIN PROPER RESULTS.—If the gas supply is deficient the tap is generally in fault, and should be replaced with what is known as a $\frac{1}{2}$ -inch meter tap, and India rubber tubing without wire must be used. If muffles are required with slits for assaying or oxidizing, it should be stated when ordering, or slits may be easily cut in the back with a penknife before the muffle has been used. After it has been exposed to high temperature the plumbago does not cut readily, and requires more care than if cut before.

New Blast Gas Furnaces.

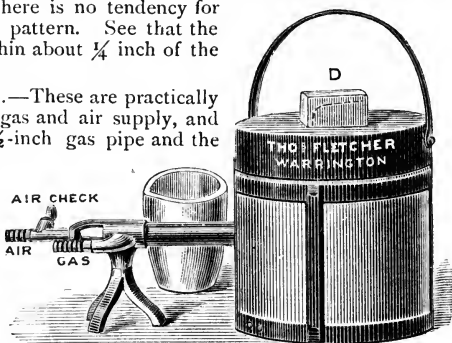
No. 41. FLETCHER'S PERFECTED INJECTOR GAS FURNACE for Metallurgists, Jewelers, Chemists, iron and brass castings, manufacturers of artificial gems, and other purposes where an ordinary furnace is useless or unreliable. This furnace, founded on the well known Injector Furnace, is, beyond comparison, the best and simplest gas furnace made.

It has been found that, in working at extremely high temperatures, the ring which holds the gauze is liable to be fused. To prevent this, a new burner has been designed, in which the ring is entirely dispensed with, and the gauze cap is pushed up from the back of the burner against a small shoulder inside the nozzle of the burner. The burner is in one casting, and, therefore, there is no tendency for the nozzle to get hot, as in the former pattern. See that the gauze is pushed up from behind to within about $\frac{1}{4}$ inch of the nozzle.

POWER AND SPEED OF WORKING.—These are practically without limit, depending only on the gas and air supply, and are under perfect control. With $\frac{1}{2}$ -inch gas pipe and the smallest foot blower, the small furnace will melt a crucible full of cast-iron scrap in thirty minutes; starting with all cold. Allowing five cubic feet of gas for heating up, it requires about four feet of gas for every pound of cast-iron melted. For small work it is as cheap as a coke furnace, and not one quarter the trouble.

BLOWING.—The quantity of air required is exceedingly small, much less than even the original Injector Furnace, and may be supplied with the No. 9a or 9b foot blower. The new pattern of foot blower is recommended, as the old pattern blower is liable to pick up dirt from the floor, throwing it against the gauze of the burner, and stopping the proper working of the furnace until cleared away.

The reverberatory dome D shown in the engraving is unnecessary except for high temperature and rapid working.



No. 41, for Gas.

INSTRUCTIONS.

Gas supply required, 2 lb. size furnace, $\frac{3}{8}$ in. pipe = 10 to 40 ft. of gas $\frac{1}{2}$ hour.

Gas supply required, 6 lb. size furnace, $\frac{1}{2}$ in. pipe = 25 to 60 ft. of gas $\frac{1}{2}$ hour.

See that all gas taps have a large clear way through. High temperatures and rapid working require a free supply of gas.

To adjust a new furnace to its highest power:—Turn on the full gas supply, light the gas, connect the blower with the air way full open, work the bellows and then put the gauze nozzle of the burner tight up against the hole in the casing. If the flame comes out of the lid about 2 inches, the adjustment is right. If the flame is longer, enlarge the hole in the air jet until the proper flame is obtained, or reduce the gas supply; if smaller, or not visible, turn the air check until the flame appears.

Keep all fluxes away from the furnace jacket.

Before stopping the blower draw the burner back from the hole.

If the blower is worked by power the furnace must not be forgotten. If left and neglected the heat becomes sufficient to fuse any crucible.

A thin layer of quick-lime on the bottom will prevent crucibles adhering when very hot.

Plumbago crucibles must be heated very slowly the first time they are used.

PRICES OF PERFECTED INJECTOR FURNACE, No. 41. FOR GAS.

Furnace A, taking No. 1 crucible, capacity 2 lb. copper, complete, . \$ 9.00

Furnace B, taking No. 3 crucible, capacity 6 lb. copper, complete, . 10.50

For foot blowers, see page 9.

No. 41. PERFECTED INJECTOR FURNACE — FOR

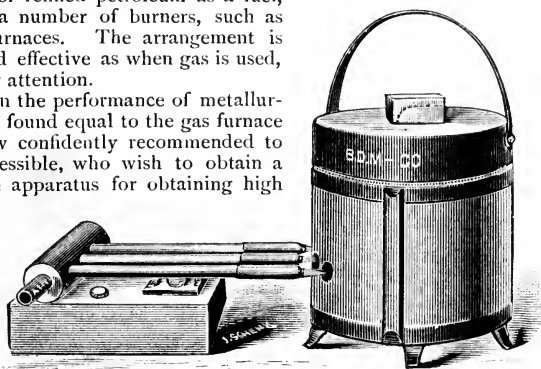
REFINED PETROLEUM. — The illustration shows the Perfected Injector Furnace fitted for the use of refined petroleum as a fuel, by the adaptation to it of a number of burners, such as are used in the No. 40b furnaces. The arrangement is in every way as simple and effective as when gas is used, requiring no more trouble or attention.

It has been fully tested in the performance of metallurgic operations, and has been found equal to the gas furnace in efficiency, and it is now confidently recommended to those to whom gas is inaccessible, who wish to obtain a simple, cheap and effective apparatus for obtaining high temperatures.

The number of burners used will vary with the size of the furnace, and a bellows of proportionate size will be required.

Cast-iron can be fused without difficulty, and in a short time.

All oil furnaces work better with the "new pattern" foot blower (see page 9), on account of not picking up dirt from the floor, and obstructing the burners therewith.



No. 41, for Petroleum.

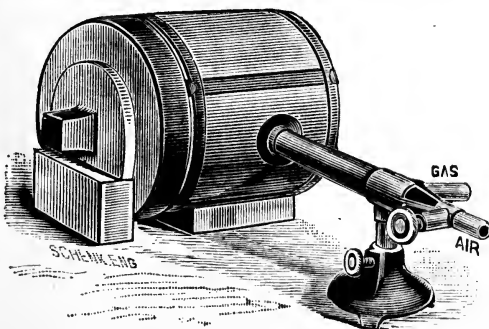
**PRICES OF PERFECTED INJECTOR FURNACES
FOR REFINED PETROLEUM.**

Furnace A, taking No. 1 crucible, two burners, without blower,	\$12.00
Furnace B, taking No. 3 crucible, three burners, without blower,	15.00
Furnace C, taking No. 6 crucible, four burners, without blower,	18.00

No. 141. PERFECTED INJECTOR — COMBINED CRUCIBLE AND MUFFLE FURNACE. — FOR GAS OR

GASOLINE. — This is supplied with muffle fittings, and can be used either as a crucible or muffle furnace. The illustration shows it as arranged for use with the muffle. When used as a crucible furnace the casing is turned on end, and a large round lid is used (see page 21). In this case the hole opposite the one used for the burner should be stopped with the taper plug furnished for the purpose. One size only is made, corresponding to the B Injector.

The same burner is used for gas or gasoline (see gasoline apparatus, page 26). When refined petroleum is used the burner for Furnace C, No. 41, is sent out with special fire clay parts.



No. 141.

PRICE.

Combined Crucible and Muffle Furnace, for gas,	\$15.00
Combined Crucible and Muffle Furnace, for gasoline, including	
Generator, without blower,	30.00
Extra Muffles,	1.50

The No. 9b blower (page 9) is required with this furnace.

Orders should specify particularly for "gas" or "gasoline" or "refined petroleum."

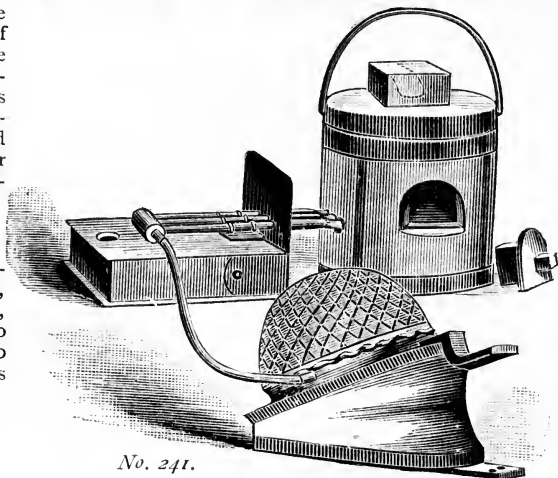
No. 241. — PERFECTED INJECTOR — COMBINED CRUCIBLE AND MUFFLE FURNACE. — FOR REFINED

PETROLEUM ONLY. — The casing of this furnace is of the size C, but with three burners, using refined petroleum as a fuel. It is supplied with muffle fittings, and can be used either as a crucible or muffle furnace. It operates precisely as No. 41.

PRICES.

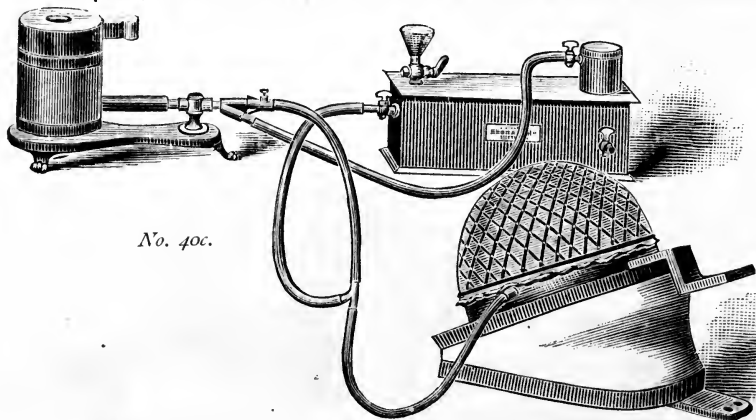
No. 241. Combined Crucible and Muffle Furnace, for refined petroleum, without blower, . \$21.00
Extra Muffles, . . . 1.50

The No. 96 blower is required with the furnace.



No. 241.

No. 40c. GASOLINE GENERATOR AND FURNACE.



No. 40c.

This consists of the No. 40a furnace and burner and a small size of Fletcher's Gasoline Generator. It operates precisely like the No. 44, page 26, the same directions for use serving for both furnaces.

To those desiring a small furnace for *high temperatures*, where gas is not available, this one will be found particularly satisfactory.

PRICES.

Gasoline Generator for No. 40c,	\$6.00
Furnace No. 40c, Generator, Blower and Tubing complete for use,	16.50
Fire Clay Pot, extra, . . . . .	.75
Fire Clay Cover, extra, . . . . .	.35
Plumbago Crucibles, No. 00, each, . . . . .	.20
Crucible Tongs, . . . . .	.65

The foot-blower furnished with the above is No. 9a.

No. 40. FLETCHER'S NEW CRUCIBLE FURNACE—

Owing to the discovery by Mr. Fletcher of a singularly perfect non-conducting furnace casing, we are enabled to produce the first really simple gas furnace ever constructed. This material is only about one-sixth the weight of fire clay, and has not one-tenth its conducting power for heat.

The furnace consists of a simple pot—for holding the crucible—with a lid, and a blow-pipe, all mounted on a suitable cast iron base. As compared with the ordinary gas furnace it appears almost a toy, owing to its great simplicity.

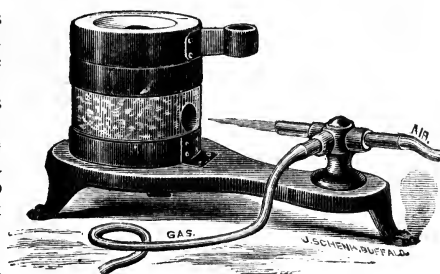
The casing holds the heat so perfectly that the most refractory substances can be fused with ease, using a common foot blower. Half a pound of cast iron requires from 7 to 12 minutes for perfect fusion; the time depending on the gas supply and pressure of air from the blower.

The power which can be obtained is far beyond what is required for most purposes, and is limited only by the fusibility of the crucible and casing.

The crucible will hold about 10 ounces of gold.

An ordinary gas supply pipe $\frac{5}{16}$ or $\frac{3}{8}$ will work it efficiently. It requires a very small supply of gas. About 10 cubic ft. per hour is sufficient for most purposes.

Crucibles must not exceed $2\frac{1}{4}$ by 2 inches. Any common blow-pipe bellows will work the furnace satisfactorily except for very high temperatures (fusion of steel, etc.), for which a heavy pressure of air is necessary.



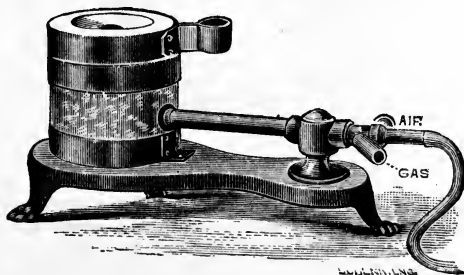
No. 40. Patented.

PRICE.

No. 40. Fletcher's New Crucible Furnace, without Blower, . . .	\$3.50
No. 9. Foot Blower,	4.00
No. 9a. Foot Blower, large high pressure,	5.00
Plumbago Crucibles, No. 00, each,	0.20
No. 40. Fire Clay Pot, extra,	0.75
No. 40. Fire Clay Cover, extra,	0.35

No. 40a. CRUCIBLE FURNACE WITH IMPROVED GAS BURNER.—

This Burner is made of the same pattern as that used with the "Perfected" Injector Furnace. It is almost noiseless in its action, and works with a very small gas supply, producing much more economical results than any gas burner heretofore used for the purpose of heating furnaces.

**DIRECTIONS.**

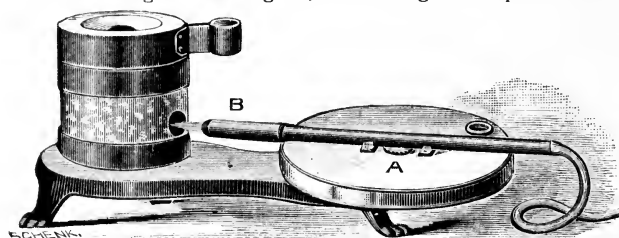
Turn on the full gas supply, light the gas, connect the blower with the air way full open, work the bellows and then put the gauze nozzle of the burner tight up against the casing. The air supply should be such that

a flame about two inches long will play out of the hole in the cover, and it may be adjusted by turning the thumbscrew on the side of the burner.

The amount of air and gas used by this burner is very small. Care should be taken that the right proportion of each is used. A *very light* but steady blast of air will give the best results.

PRICE, No. 40a, Perfected Burner, without blower,	\$4.50
Extra Burner,	2.50

No. 40b. CRUCIBLE FURNACE FOR REFINED PETROLEUM.—The gas furnace No. 40 having proved itself so thoroughly efficient and satisfactory, a modified pattern has been designed, retaining all the peculiar advantages of the original, but burning refined petroleum instead of gas as fuel ;



and improvements recently made enable us to confidently recommend it as being fully equal in efficiency to the gas furnace.

The burner for this furnace is constructed upon the principle of an atomizer; this of course dispenses

with a wick. This method has proved the most efficient of any we have experimented with.

The recent improvements consist in a device for regulating the supply of oil, which is operated by the milled nut (marked A) shown on top of the reservoir in the cut, and the addition of an annular jet of air, which is regulated by turning the sleeve (marked B).

This burner is so made that it can be taken apart and cleansed, in case there should be any obstruction to its proper working. Remove the burner from the reservoir, by unscrewing the small screws; draw out the oil tube, which is operated by the milled nut A, take off the sleeve B, and remove the inside tube.

The same furnace and stand are used for either gas or petroleum, the lamp being fitted for adjustment in place of the gas burner, so that the same apparatus can be furnished for burning either gas or refined petroleum.

There is no doubt that these furnaces in one or both forms will become a necessity in every workshop, as they fill a place intermediate between a blow-pipe and a large furnace—which has never yet been filled; whilst their strength, cheapness, simplicity, and general usefulness recommend them to all.

The foot blower, No. 9a, price \$5.00, will work this furnace satisfactorily.

This size takes crucibles not exceeding $2\frac{1}{4}$ by 2 inches, capacity $\frac{1}{2}$ lb. of copper or about 10 ozs. of gold.

PRICE.

No. 40b, Crucible Furnace for Petroleum, without blower, . . .	\$5.00
No. 9a, Foot Blower,	5.00
Plumbago Crucibles, each,	0.20

DIRECTIONS FOR OPERATING PETROLEUM FURNACES.

The oil supply is increased by turning the milled nut A, in the direction of the arrow-mark on the reservoir. A plentiful supply should be used when the furnace is first lighted, and afterwards reduced. By working the bellows a spray of oil will be blown into the furnace, which should be lighted with a wisp of paper. The sleeve B should be screwed on to the pipe at this time, and then gradually screwed off—to adjust the air supply. When the proper proportion of oil and air is attained, a blue flame streaked with red will appear at the top of the furnace, and a yellow flame will flutter in and out of the hole below. A few trials will be necessary before the adjustment will be easily made.

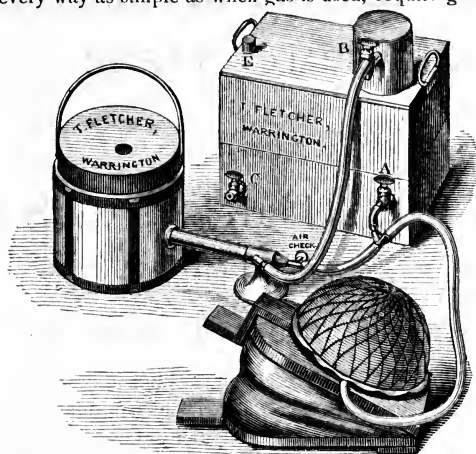
PLUMBAGO CRUCIBLES—Designed especially for Fletcher's Gas Furnaces. These crucibles are round, made from special patterns, and are the most durable in market.

PRICES.

No. oo.	2 inches diameter,	$2\frac{1}{4}$ inches high,	. . . . .	20 cents.
" 0.	$2\frac{3}{8}$ "	$2\frac{1}{2}$ "	. . . . .	20 "
" 1.	$2\frac{1}{2}$ "	3 "	. . . . .	22 "
" 2.	$2\frac{3}{4}$ "	$3\frac{1}{2}$ "	. . . . .	23 "
" 3.	$3\frac{1}{2}$ "	4 "	. . . . .	25 "
" 6.	$4\frac{1}{2}$ "	$6\frac{1}{2}$ "	. . . . .	60 "
Crucible Covers, per doz.,				75 "

No. 44. FLETCHER'S GASOLINE GENERATOR AND FURNACE.—FOR HIGH TEMPERATURES.

The well-known Injector Gas Furnace, which in power, simplicity, and convenience, has not been approached by any known furnace, can now be supplied with a small, simple, and safe arrangement for burning the vapor of the light petroleum or gasoline, giving a power and efficiency fully equal to that which can be obtained by a large gas supply. The arrangement is in every way as simple as when gas is used, requiring no more trouble or attention.



It not only equals a gas furnace in every respect, and can be used where gas is not available, but, in addition, it gives a flame and heat of absolute purity, fitting it for the most delicate chemical operations where gas cannot be used owing to the presence of sulphur and other matters.

The ordinary pattern of Injector Furnace is used in precisely the same way as with gas, the only difference being that a branch pipe is taken out of the air supply and connected to the lower tap A on the generator, and a tube is carried from the upper tap B, to the side tube of the Injector burner, marked "gas." The quantity of vapor required is adjusted by the lower tap A when the furnace is working, and the

flame must be just visible at the hole in the lid, exactly as when gas is used, the instructions being precisely the same for both fuels.

To charge the generator, pour gasoline in the funnel cock until it overflows at the small tap C in the side, close the funnel cock and also the overflow tap. It will then work for about ten to twelve hours at the full power of the Furnace.

Gasoline varies much in quality. It must, when a few drops are poured on a plate or the hand, evaporate quickly and completely, leaving no greasy stain, and if good will produce more vapor than the furnace can burn at its maximum power. All the tubing used must be perfectly smooth inside, or the power of the furnace is greatly reduced.

At the conclusion of an operation close both taps on the generator. It can then be left for any length of time ready for instant use. For ordinary meltings the generator can be used about thirty or forty times without refilling.

This arrangement is strongly recommended, not as a makeshift, but as *at least* equal in power and convenience to the best gas furnace ever constructed.

PRICES.

Gasoline Generator, for No. 44,	\$15.00
Furnace A, Blower, Generator and Tubing complete for use with either gasoline or gas,	31.00
Furnace B, Blower, Tubing, and Generator complete,	32.50

The engraving shows the B size Furnace, Generator and Blower, as when in use. Scale, 1 inch to the foot.

The foot blower supplied with above is No. 9b.

CLAY ASSAY CRUCIBLES.—These are perfectly smooth, and of the correct porosity.

FOR GOLD.

	Diam.	Height.	Per doz.
No. A,	1½ in.,	1½ in.,	\$1.80
" B,	1¼ " "	1¼ " "	1.80
" C,	1¾ " "	1½ " "	1.80
" D,	1¾ " "	2 " "	1.80

FOR IRON.

	High.	Wide.	Per doz.
No. A,	3¾ in.,	1½ in.,	\$0.50
" B,	3¾ " "	2½ " "	1.00
" C,	4¼ " "	2¾ " "	1.40

All styles and sizes of Crucibles furnished to order.

FLETCHER'S GAS COOKING AND HEATING APPARATUS FOR DOMESTIC USE.

PATENTED AND MANUFACTURED BY

THOMAS FLETCHER, F. C. S.,

Museum Street, Warrington, England,

And by BUFFALO DENTAL MANUFACTURING CO., Buffalo, N. Y.

Mr. Fletcher says: I have been so constantly asked for cooking apparatus, and repeatedly consulted with regard to apparatus in use, and the advisability of making alterations, that I have decided to make cooking apparatus in addition to the special laboratory arrangements now so well known.

We have used gas to the *total* exclusion of fires for cooking for the last 18 years. During that period constant experiments have been made, with the object of getting the most perfect results with the least trouble and expense, for our own convenience.

The burners and oven are patented in all details, and are the same precisely as we have now in daily use. They are *simple, cheap, and within the capacity of an ordinary servant*. The actual cost of gas cooking is less than half the cost of coals, and in addition, the absence of gas for cooking in our own house would entail the employment of at least one extra servant, and greatly-increased wear and tear in cleaning. For 18 years our cooking has been done on a table under the kitchen window. The oven and three boiling burners are all the apparatus necessary for any ordinary family.

The oven is fully hot in less than one minute. To work the whole of the burners and the largest oven at their fullest power all at once requires a $\frac{5}{8}$ -inch gas supply pipe and tap, which can in almost every case be fixed by a plumber for a few shillings. In case of removal, the pipe can be taken and refixed in a new house with little expense. Our own fittings have traveled through four houses in eighteen years.

The oven is the most important point; underneath the burner small joints of meat, fish, potatoes, apples, &c., can be roasted perfectly, and toast quickly made. In the lower oven, pastry can be baked quickly and perfectly, and meat can be *roasted*, not baked as in an ordinary oven. In the upper oven, meat can be stewed, custards, rice puddings, &c., made, and the hundred odd things done which are so constantly required. This upper oven is not fitted to the small size apparatus, and is not necessary in the ordinary cooking for small families. It utilizes the little waste heat only, and can never be got hot. Puddings can be slowly cooked, but must be finished and browned in the lower part.

With regard to the system by which the oven is heated, the burner is at the top of the lowest part, where the gas is perfectly burnt, thereby heating the bottom of the lower oven, which radiates heat downwards for grilling, toasting, &c. The burnt air is taken

in at the sides and carried up round the food as a hot jacket ; the same thing is done again in the upper oven with the heat not already utilized.

By this system fish can be cooked underneath joints or fowls, and pastry, *all at once with one burner*, without the slightest alteration in the most delicate flavors. All are as perfect as they can be, and by this system the consumption of gas is reduced to less than one-half what is usually burnt, whilst any character of heat, dry or moist, quick or slow, can be got instantly without trouble.

The whole of the products of combustion and the vapors and smells of cooking are led up to one opening in the top, which, if desired, can be connected with a pipe to any convenient flue, although this will not be found necessary except in very confined kitchens.

In reply to several inquiries : I do not supply boiling burners fixed on the top of the oven. To do good work in the oven it must be at a convenient height, so that the whole of the contents can be seen instantly, and easily handled. It must therefore be too high for burners on the top. Further than this, boiling burners never work well on the top of an oven in use ; they are very liable to smell, and never do the work they ought for the gas consumed.

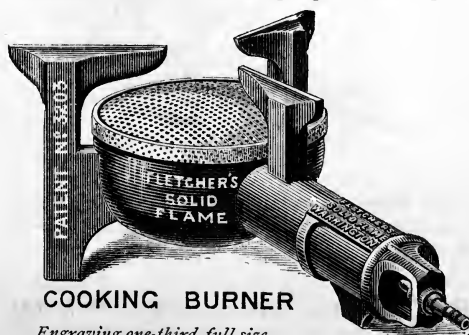
The new boiling table can be used if necessary on the top of the oven ; but I do not recommend it to be so used, as one burner never works properly if placed over another.

The boiling burners are two sizes : the largest, whilst at its fullest power, will burn 25 cubic feet of gas per hour, is for large pans and quick heating. It will boil quickly four or five gallons of water for children's baths, and will, when required, keep a small pan boiling steadily by simply turning the gas low. The small burners at their fullest power burn 10 cubic feet of gas per hour, and are for general work. It is advisable to use the large burner only, as far as possible, for very large or very small work, as it is not so economical as the small burners for medium work, although the difference is not great. As soon as boiling heat is reached, turn the burners low ; about 2 feet of gas per hour will keep a pan boiling.

The statement as to the very unusual power of Fletcher's patent burners has been so repeatedly denied by those interested in the older forms, that the following tests made, without my knowledge, by R. Briggs, Esq., C. E., and published in the "Journal of the Franklin Institute," will set the matter finally at rest : "A cooking stove, fitted with the Bunsen Burner, formed by a ring of 1 1/4-inch pipe, with jet holes 1 inch apart, gave 244 units of heat for each cubic foot of gas. Fletcher's patent solid flame burner gave 450 units of heat for each cubic foot—nearly double the work for the same cost."

No. 47. FLETCHER'S SOLID FLAME BOILING BURNERS

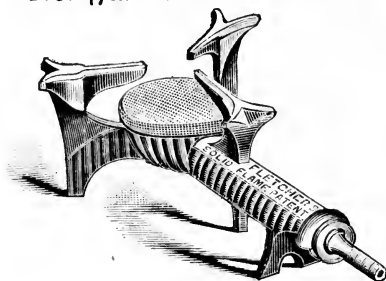
—For large pans and quick heating. It will boil quickly



four or five gallons of water for children's baths, and will, when required, keep a small pan boiling steadily by simply turning the gas low. The small burners at their fullest power burn 10 cubic feet of gas per hour, and are for general work. As soon as boiling heat is reached, turn the burners low. About 2 feet of gas per hour will keep a pan boiling.

No. 47. Large size for large pans, &c. Price, \$2.00.

No. 47a. SOLID FLAME BOILING BURNER.—A small size of No. 47, and of the same power as No. 51. Made from improved patterns.



No. 47a.

PRICE.

No. 47a, \$2.00

No. 48. Small size. For general use.

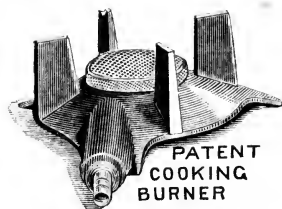
PRICE.

No. 48, \$1.75.

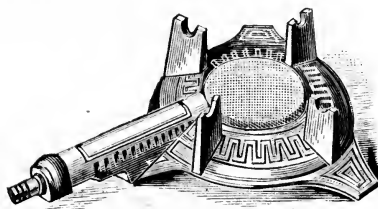
No. 48a. New ornamental pattern for the breakfast table, &c. Same power as No. 48.

PRICE.

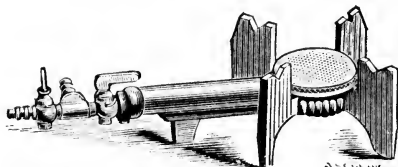
No. 48a, \$2.00.



No. 48. Engraved quarter size.



No. 48a.



No. 51.

No. 51. New pattern, with tap and extra tap to supply small oven or another burner from one gas pipe.

PRICE

With 2 taps, as engraved, . . \$3.75

Without taps, 1.75

For table use, and also where the gas supply is deficient, both these burners, Nos. 48a and 51, are better with the new **SHORT FLAME CAP**. Price the same.

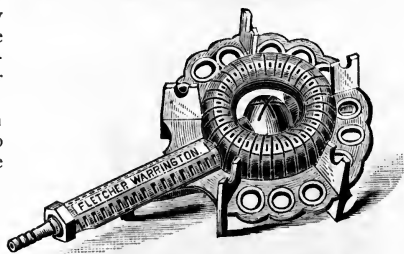
No. 1 R. SOLID FLAME RADIAL BURNERS.—This

burner has no loose parts, and is practically undamageable and indestructible with the roughest use. It is entirely made of annealed cast iron, and has no loose cap or gauze.

The flame is practically solid when in use, and is without any tendency to run to a point in the centre. The carbonic oxide flame is unusually short.

PRICE.

No. 1 R, Radial Burner, . \$2.00



No. 1 R.

IN ORDERING, specify the goods wanted by the Number, in this Price List, but if the exact apparatus required cannot be specified, the work to be done should be precisely and minutely explained.

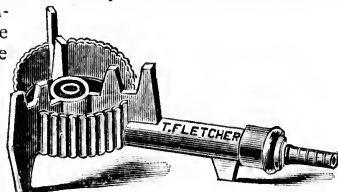
ALL INDIA-RUBBER TUBING used must be **SMOOTH INSIDE**, made without wire, and of as large a bore as can conveniently be used.

Nos. 200 and 201. FLETCHER'S ARGAND BUNSEN.—

A cheap, simple and indestructible burner for general laboratory work. The flame of these burners is shorter, more compact, and higher in temperature than an ordinary Bunsen, and is also free from smell. The air supply is self-adjusting. The sizes given are the bore of the horizontal tube.



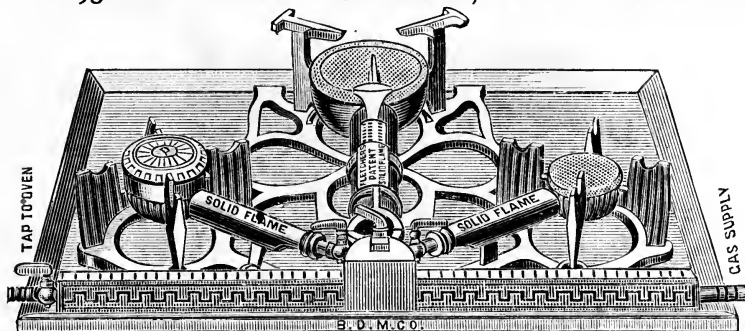
No. 200.



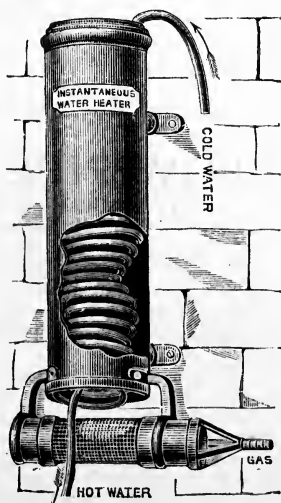
No. 201.

PRICES.

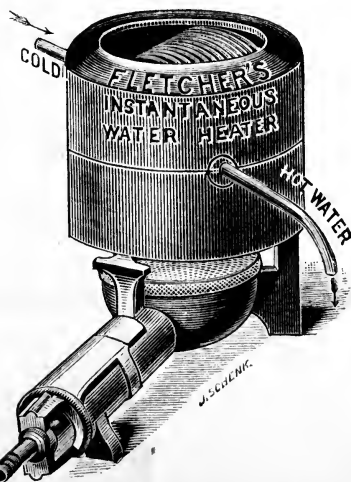
		Without Tripod.	With Tripod.
$\frac{3}{8}$ -in. size, gas consumption	2 ft. per hour, . . .	No. 200, \$0.75	No. 201, \$1.00
$\frac{1}{2}$ -in. " " " "	$3\frac{1}{2}$ " " " "	" " 1.00	" " 1.25
$\frac{3}{4}$ -in. " " " "	7 " " " "	" " 1.25	" " 1.50

No. 93b. BOILING BURNERS, ON TRAYS.

Three Fletcher's solid-flame burners on fretwork stand, in tray, with taps to each, and tap to supply oven at the side. **PRICE.**—No. 93 $\frac{1}{2}$, complete, \$



INSTANTANEOUS WATER HEATER—FOR LAVATORY AND SCULLERY—Price, \$10.00.



INSTANTANEOUS WATER HEATER—FOR LAVATORY. Price, complete, with Burner as engraved, \$5.00.

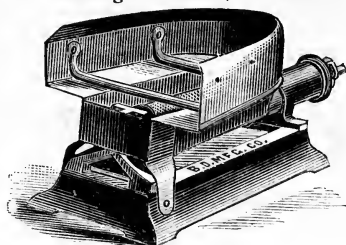
SMOOTHING IRON HEATERS.

This heater is constructed on the same base as the soldering iron heater, and is an exceedingly economical burner. It does not smoke the smoothing iron. A milled nut on the gas jet enables the operator to regulate the gas with a nicety not obtained by a gas cock, and we find that better results are obtained by regulating at the gas jet, than further away from it.

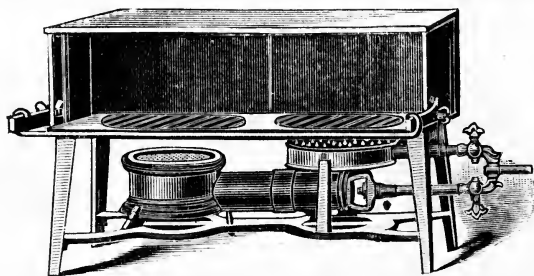
This heater will heat an eight-pound smoothing iron in six minutes—expense for gas when in use, about one cent an hour, with gas at \$2.00 per M.

PRICE.

Smoothing Iron Heater, . . . \$2.00



BOOK FINISHERS' GAS STOVE.



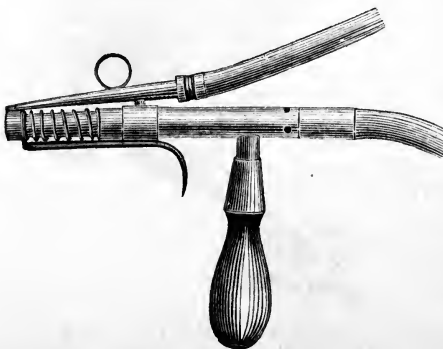
This gas stove is made expressly for Book Binders' use, and after two years' trial is believed to meet their requirements fully. It produces a more even heat without smoking the tools than any other stove now in use for this purpose.

The Burning Roll Flame is obtained from a Fletcher's Solid Flame Burner, which heats the roll very rapidly. The heat for the Pallet or Gold Roll is obtained from a Fletcher's Evaporating Burner, which distributes a small quantity of flame over a large surface, and is a remarkably economical burner.

The whole apparatus is of cast iron, nicely and strongly made. The top can be used for keeping tools warm.

PRICE.—Book Finisher's Gas Stove, . . . \$12.00

THE SNOW GAS BLOW-PIPE.



The connection for both gas and air are made with rubber tubing, giving great facility in directing the flame. The gas mixes with air in its passage through the blow-pipe and burns without smoke. Motion can be given to the air pipe by means of the trigger shown in the cut, and a pointed or "brush" flame obtained at will. There is a valve in the gas pipe, opening and closing automatically, which, when the blow-pipe is hung up by its ring, will partially shut off the gas, allowing only sufficient to pass to keep alight. When the instrument is held in the proper position for use the passage of the gas is unobstructed.

PRICE.—Snow Gas Blow-pipe, nickel plated, . . . \$4.00

LABORATORY GAS BURNER.

FOR DENTISTS, DRUGGISTS AND JEWELERS.

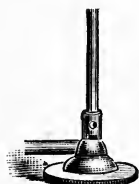
This lamp is so constructed that it burns gas with a blue flame without smoke, and gives an intense heat. It is an admirable substitute for the alcohol lamp. It will be found a very convenient burner for Dental Laboratory use in heating water, "waxing up" a base plate, vulcanizing, and in fact for general heating purposes.

It is used quite extensively by druggists for evaporating, heating, etc., and will be found equally good for family use in the nursery or sick room, where a small amount of heat is required. The spider can be removed, as shown in the cut.



PRICES.

Gas Laboratory Lamp,	\$0.75
Gas Laboratory Lamp, with Spider,	1.00



BUNSEN BURNER.—This burner is constructed wholly of brass, nicely adjusted and polished. The flame is as near perfect as can be, and for chemical laboratory use is preferred to any of the cheap Bunsens.

PRICE, \$1.50

PRICES FOR ORDINARY MOUTH BLOW-PIPES (Brass).

9-inch, plain, each,	\$0.15
10 " " " . . . . .	.18
11 " " " . . . . .	.20
12 " " " . . . . .	.23
13 " " " . . . . .	.28

PRICES FOR INDIA RUBBER TUBING.

Int. Diam. $\frac{1}{8}$ inch,	\$0.10 per foot.
" $\frac{3}{16}$ " . . . . .	.14 "
" $\frac{1}{4}$ " . . . . .	.18 "
" $\frac{5}{16}$ " . . . . .	.20 "
" $\frac{3}{8}$ " . . . . .	.23 "
" $\frac{1}{2}$ " . . . . .	.28 "
" $\frac{5}{8}$ " . . . . .	.33 "
" $\frac{3}{4}$ " . . . . .	.38 "
" 1 " . . . . .	.50 "

MEDALS, &c., AWARDED TO THOMAS FLETCHER.

- 1871.—FIRST CLASS BRONZE MEDAL—Royal Cornwall Polytechnic Society.
- 1872.—SILVER MEDAL—Royal Cornwall Polytechnic Society.
- 1873.—INTERNATIONAL EXHIBITION PRIZE MEDAL.
- 1876.—EXHIBITION SCIENTIFIC APPARATUS—South Kensington.
- 1877.—CERTIFICATE OF MERIT—Mining Institute of Cornwall.
- 1880.—SILVER MEDAL—Society of Arts, London.

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W.		

Fire Clay , Fine.....	Per lb., \$.10	
Fluor Spar , Cryst.....	"	.15	✓
" " Pow'd.....	"	.10	✓
Formyle , Chloride.....	Per oz.,	.20	
" Bromide	"	2.50	
" Iodide	Per dr.,	.50	
Fusible Metal	Per oz.,	.40	
Fusel Oil , Pure.....	Per lb.,	1.00	
Fruit Essences , Artificial; all varieties kept.			

G.

Galena , Fine, for Blow-pipe work.....	"	.30	✓
Galls , Ground.....	Per oz.,	.05	
" Tincture of.....	"	.15	
Glass of Borax	"	.25	
Glucina , Carbonate.....	Per dr.,	1.50	
" Hydrate	"	1.50	
Glucose , in lumps.....	Per lb.,	.15	
Glycerinè , Puriss.; water free, T.....	"	.75	
" Best American; very fine; free from lead and all earthy matters.....	"	.50	
Gum , Arabic, picks... ..	"	.75	
" " sorts.....	"	.50	
" Benzoin.....	Per oz.,	.10	
" Tragacanth.....	"	.10	
Gums , of all kinds, at lowest market rates.			
Gold , Chloride, Sol.....	"	2.00	
" Ditto, Dry, Pure, 15 gr. bottles.....	"	25.00	
" Oxide.....	"	35.00	
" Metallic Leaf, xx Deep, Per book, .....		.75	
Graphite , Pow'd. Pure T	Per lb.,	1.00	
" In Lump.....	"	.25	
Gutta Percha . Pure. In Sticks.....	Per oz.,	1.00	
Gypsum , Pulv.....	Per lb.,	.10	
Gelatine , Pure	Per oz.,	.15	

H.

Hæmatoxyline	Per. gr.,	.08	
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I.

Indigo , Pure, Best Bengal.....	Per oz., \$.15
“ Sulphate Sol.....	“	.10
Iodine , Pure, Resublimed, T.....	“	.50
“ Crude.....	“	.40
Iridium , Mett.....	Per gram.	2.50
“ Chloride	“	1.80
Iridosmium	“	.50
Indium , Mett.....	“	6.50
Iron , by Hydrogen, Pure.....	Per oz.,	.15
“ Pulv., Sub., Pure.....	“	.10
“ Wire, Pure... ..	“	.20
“ Acetate.....	“	.40
“ Ammoniated.....	“	.10
“ Limatura, Alcoholized.....	“	.05
“ Arseniate.....	“	.40
“ Bromide.....	“	.35
“ Carbonate, Precc. T	Per lb., .60,	“ .10
“ “ Proto, Precc.....	“	.15
“ Chloride, Sesqui, Sol.....	Per lb.. .60,	“ .06
“ “ “ Fine Cryst., C. P..	“ \$100,	“ .10
“ “ “ Proto	“ .75,	“ .10
“ Chromate, Native.....	Per lb.,	.25
“ Citrate, U. S. P.....	Per oz.,	.15
“ “ and Ammonia.....	“	.15
“ “ and Manganese.....	“	.20
“ “ and Magnesia	“	.20
“ Ferrocyanide, Pure.....	“	.12
“ “ Com.....	“	.10
“ Filings.....	Per lb.,	.10
“ Iodide, C. P.....	Per oz.,	.50
“ “ Com.....	“	.40
“ Lactate, Pure.. ..	“	.20
“ Oxide, Hydrated Peroxide.....	Per lb.,	1.50
“ “ Proto.....	Per oz.,	.10
“ “ Red Oxide, Precc.....	Per lb.,	1.20
“ “ Black Oxide, C. P.....	Per oz.,	.15
“ “ “ Com'l.....	Per lb., .75,	“ .10

Iron, Nitrate, Per. Sol.....	Per lb., \$.50, Per oz., \$.10
“ Phosphate, Proto.....	“ .60, “ .10
“ “ Per.....	“ 1.00 “ .15
“ Pyrophosphate, in Plates.....	“ .15
“ Sulphate, C. P., Cryst.....	Per lb., .09
“ “ Dried.....	“ .18
“ “ and Ammonia, C. P.....	“ .20
“ “ and Potassa.....	Per lb., .80, Per oz., .10
“ “ Sub., Pure.....	“ .15
“ Sulphide, Fused, Opt.....	Per lb., .20 ✓
“ “ Gran.....	“ .30
“ Tannate, Pure.....	Per oz., .40
“ Tartrate.....	“ .20
“ “ and Ammonia.....	“ .15
“ Tersulphate, Sol., Opt.....	Per lb., .60
“ “ and Potassa.....	Per oz., .15
“ Tungstate.....	Per lb., .40
“ Valerianate.....	Per oz., .60

J.

Jalapine,	Per oz., 2.00
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K.

Kermes, Mineral.....	Per lb., 2.50
Kaolin, Pure, White.....	“ .15
Kreatine	Per gram. 5.00

L.

Lead, Acetate, C. P., T.....	Per lb., .75
“ “ Com'l.....	“ .50
“ “ Tribasic.....	Per oz., .40
“ “ Sub., Sol.....	Per lb., .40
“ Bichromate, Pure.....	Per oz., .25
“ Carb., Neutral.....	Per lb., .35
“ “ Native. See Minerals.	
“ Chloride, C. P.....	Per oz., .10
“ Chromate, for Organic Analysis.....	“ .15
“ Hyposulphite.....	“ .10
“ Iodide.....	“ .40

Lead , Mett, C. P., in drops, for Assay purposes.....	Per lb., \$	.75
“ Nitrate, Pure.....	“	.70
“ Oxide, Red.....	“	1.00
“ “ Proto, Pure.....	“	.25
“ “	Per oz.,	.10
“ “Phosphate, Pure.....	“	.30
“ Sulphate, C. P.....	Per lb.,	.50
“ Tartrate, Pure.....	Per oz.,	.20
“ Tannate	“	.25
Lithia , Carbonate, C. P.....	“	1.50
“ Citrate	“	1.25
“ Sulphate.....	“	1.50
Lime , Chloride, Com'l.....	Per lb.,	.20
Lithium , “ C. P.....	Per oz.,	1.50
“ Bromide	Per oz.,	1.20
“ Iodide	“	1.25
Litmus . In Cubes, Pure.....	“	.10
“ Paper, Blue and Red.....	Per sheet	.05
Logwood . In Chips.....	Per lb.,	.10
“ Extract.....	Per oz.,	.10
“ In Billets	Per billet,	.50
Lupiline	Per oz.,	.10
Lycopodium	“	.10

M.

Magnesia , Caustic. C. P. T.....	Per lb.,	2.00
“ Carbonate, Precp.....	Per oz.,	.15
“ Native. See Minerals.		
“ Citrate, Pure.....	Per lb.,	.20
“ Nitrate.....	Per oz.,	.20
“ Hypophosphite.....	“	.75
“ Phosphate.....	“	.40
“ Sulphate, C. P.....	Per lb.,	.30
“ Valerianate	Per dr.,	.30
“ Sulphate, Com'l.....	Per lb.,	.10
“ Sulphite	Per oz.,	.10
✓ Magnesium , Ribbon.....	Per foot, .05,	“ 3.75
“ Wire.....	“ .05,	“
“ Bromide.....	“	1.00

Magnesium , Iodide.....	Per oz.,	\$ 1.00
“ Chloride, C. P.....	Per lb.,	.30
Manganese , Mett	Per gram.	1.00
“ Acetate.....	Per oz.,	.30
“ Bromide.....	“	1.25
“ Carbonate. T	“	.35
“ Citrate.....	“	.25
“ Per Oxide; high test; Pulv.....	Per lb.,	.10
“ Chloride, Pure.....	Per oz.	.20
“ Hypophosphite	Per oz.,	.65
“ Iodide.....	“	1.10
“ Phosphate.....	“	.50
“ Nitrate.....	“	.35
“ Sulphate, C. P., Cryst.....	Per lb., \$2.00	“ .20
Mannite	Per dr.,	.30
Meconin	Per dr.,	2.50
Morphia , Pure Alkaloid.	Price, per oz.,	9.00
“ Bimeconate.....	“	12.00
“ Chloride	“	10.25
“ Nitrate	“	12.00
“ Sulphate.....	“	7.00
“ Valerianate	“	8.50
Mosaic , Gold	Per oz.,	.35
Mercury , Redistilled, Best,.....	Per lb.,	1.25
“ “ in quantities, special price.		
“ Acetate	Per oz.,	.50
“ Bromide.....	“	.50
“ Chloride, Proto.....	“	.30
“ “ Per Am.....	“	.15
“ Cyandide, T.....	“	.50
“ Chloride, C. P. T., Per.....	“	.35
“ Iodide, Proto.....	“	.55
“ “ Deuto.....	“	.50
“ Oxide, Black.....	“	.50
“ “ Proto, Red.....	“	.25
“ “ Yellow.....	“	.35
“ Sulphide, Black.....	“	.20
“ “ Red	“	.25
“ Sulphocyanide.....	“	.35

Mercury, Sulphate, Basic	Per oz., \$	.20
“ “ Neutral.....	“	.35
“ Nitrate, Proto, T	“	.30
“ “ Per, T.....	“	.45
Methyline	Per lb.,	1.00
Minium, Opt	“	.15
Microcosmic Salt, Pure	Per lb., \$1.50, Per oz.,	.15
Molybdenum, Mett	Per gram.	.50
“ Oxide, C. P.....	Per oz.,	.55
“ Sulphide.....	“	.60
Menisperin, Pure		2.00

N.

Naptha, Refined	Per lb.,	.55
“ Wood	“	.75
Naphaline, Pure, T	Per lb., \$1.50, Per oz.,	.20
Narceia	Per dr.,	7.50
Narcotine, C. P	Per oz.,	2.50
Nessler's Solution, for delicate Ammonia reactions,		
	Per fluid oz.,	.25
Nickel, Mett. Cubes	Per oz.,	.40
“ Carb, Pure.....	“	.75
“ Chloride, T.....	“	.75
“ Nitrate, C. P. T.....	“	.80
“ Oxalate, “	“	1.00
“ Oxide.....	“	1.00
“ Sulphate, C. P.....	“	.50
“ “ and Ammonia.....	“	.75
Nicotine	“	16.00
Nitro-enzol	Per oz.,	.15

O.

Ores and Minerals. See Minerals and Fossils.

Osmium, Mett	Per gram.	3.50
Olive Oil, True	Per pt.,	.60
Oils, Essential; all varieties kept; True		
“ Rapeseed.....	Per pt.,	.50

P.

Palladium , Mett	Per gram.	3.00
“ Chloride, 1 dr. bottles.....	dr.,	7.00
Parafine , Opt., Pearl.....	Per lb.,	.40
Phosphorus . In Sticks.....	Per lb., \$1.50, Per oz.,	.15
“ Amorphous.....	“	.30
“ Chloride.....	Per dr.,	.75
Pancreatine	Per oz.	.75
Picrotoxine , Pure.....	Per oz.,	12.00
Pyroxilic Spirit , Pure.....	Per qt.,	.50
Piperine	Per oz.,	1.30
Pepsine , Best, Refined.....	Per oz.,	1.25
Phloridizine	“	3.50
Platinum , Chloride, Sol.....	Per oz.,	.75
“ “ Dry, T.....	“	7.50
“ “ and Sodium.....	“	7.00
“ Sponge.....	Per gr.,	.03
“ “ for Hydroplatinic Lamp.....	Each,	.25
“ Wire.....	Per gr.,	.2½
“ Sheet	“	.2½
“ Plate.....	“	.03
Potassa , Acetate, Pure.....	Per oz.,	.10
“ Antimoniate	“	.30
“ Arseniate.....	“	.10
“ Arsenite.....	“	.10
“ Bicarbonate, C. P. T.....	Per lb.,	.50
“ “ Com'l.....	“	.10
“ Bichromate.....	“	.25
“ “ Puriss	Per lb. \$1.00, Per oz.,	.10
“ Binoxalate	“	.20
“ Boro-Tartrate. T	“	.15
“ Bisulphate, C. P. T	Per lb.,	.60
“ Bitartrate, Cryst.....	“	.50
“ “ Puriss., T.....	“	1.00
“ “ Pow'd	“	.40
“ Bromide	Per oz.,	.15
“ Carbonate, C. P., Sicc.	Per lb.,	2.00
“ “ Com.....	Per lb.,	.20

Potassa,	Carbonate and Carb. Soda, C. P.....	Per lb., \$	2.00
"	Caustic, Fused, White, C. P. T.....	"	.60
"	" " Brown.....	"	.50
"	" " C. P., Am.....	"	.75
"	" " Dep. Alcohol, Puriss.....	"	2.00
"	Chlorate, Cryst., Best.....	"	.40
"	" Puriss.....	"	1.00
"	Chromate, Puriss.....	Per lb., \$1.50 . Per oz.,	.15
"	" Com.....	Per lb.,	.60
"	Citrate.....	Per oz.,	.15
"	Cyanide, Fused, Alb., Opt.....	"	.15
"	" " " In 10 lb. cans.....	Per lb.,	.80
"	" " " C. P. T., Per lb.,	Per oz.,	.75
"	Chloride, C. P., T.....	"	.10
"	Ferrocyanide, Pure..T.....	"	.15
"	Ferridecyanide " ".....	"	.25
"	Fluoride, C. P., T.....	"	.75
"	Hypochlorate.....	"	.40
"	Hypophosphite.....	"	.25
"	Iodide, Pure Cryst(variable price)	"	.30
"	" Fused Puriss, T.....	"	.75
"	Iodate.....	"	
"	Hypermanganate.....	"	.20
"	Manganate.....	"	.15
"	Lactate.....	"	1.00
"	Liquor.....	Per lb., .40	" .10
"	Nitrate Cryst.....	Per lb.,	.20
"	" C. P., Gran.....	"	.50
"	Phosphate, Pure.....	"	2.50
"	Nitrite, Pure, T.... in sticks.....	Per oz.,	.30
"	Oxalate.....	"	.20
"	" Bin.....	"	.10
"	Pictrate, very scarce.....	"	2.50
"	Silicate, Sol., C. P., T.....	"	.05
"	" Dry " ".....	Per lb.	.60
"	Sulphate, Cryst., Pure.....	Per lb.,	.50
"	" Pulv.....	"	.16
"	Sulphite, Cryst.....	Per oz.,	.45
"	Sulphide, Fused C. P.....	"	.20

Potassa , Tartrate, Cryst. C. P. T.....	Per oz., \$	.15
Potassium . In $\frac{1}{4}$ oz. vials.....	Per oz., \$3.50, Per $\frac{1}{4}$ oz.,	1.00
“ Sulphocyanide... C. P. T.....	Per oz.,	.40
Propylamin , Pure.....	Per oz.,	1.50
“ Chloride.....	Per $\frac{1}{8}$ oz.,	6.25
Proteine	Per oz.,	
Prussian Blue	“	.10

Q.

Quinia , Pure.....	Per oz.	4.25
“ Acetate	Per oz.,	4.25
“ Arseniate.....	“	6.00
“ Chloride	Per oz.,	3.50
“ Sulphate.....	Per oz.,	“ 2.35

R.

Rare Resinoids—Podophyllin, Leptandrin, Cimicifugin, Macrotin, Alnuine, Ampelopsine, Apocynin, Asclepidin, Baptisin, Barosmin, Caulophyll, Cerasine, Chelonine, Colocynthine, Cornine, Corydalia, Cypripedine, Digitalin, Dioscorein, Eryngine, Euonymine, Eupatoidin, Eupatorine, Eupurpurin, Fragerin, Gelseminine, Geranine, Hamamelin, Helonin, Humulin, Hydrastine, Hydrastin, Hydrastia Mur., Hydrastia Sulp., Hyoscyamine, Irisin, Jalapin, Juglandin, Lobelin, Menispermmin, Myricin, Panduratin, Phytolacin, Populin, Prunine, Rhusin, Rumicin, Sanguinarina, Sanguinarina Sulph., Scutellarine, Senecionine, Stillingine, Trillin, Veratrin, Verbenine, Viburnin, Xanthoxylin.

Rheine , Tilden's.....	Per oz.,	4.25
Rhodium , Mett	Per gram.	5.00
Rubidium , Chloride.....	“	.50
Rhigoline , Inoderous; Sp. Grav. 620.....	Per botl.,	.75
Ruthenium , Mett	Per gram.	6.50

S.

Salicine	“ Per oz.,	.50
Sanguine , Best Fr.....	Per lb.,	1.25

Selenium	Per dr., \$.75
Silicium	Per gram. 4.00
Santonin , Pure, Alkaloid.....	Per oz., .75
Silica , Fine ground.....	Per lb., .15
Silver , Mett Foil.....	Per oz., 1.75
“ Gran., Pure.....	“ 2.50
“ Leaf, “.....	Per book, .25
“ Acetate, Pure.....	Per oz., 3.50
“ Bromide.....	“ 2.50
“ Chloride.....	“ 1.60
“ Cyanide. Sol.....	“ 2.50
“ Carbonate.....	Per oz. 3.60
“ Iodide, Pure.....	Per oz., 2.50
“ Nitrate, C. P., Cryst.....	“ 1.00
“ Oxide.....	“ 1.75
“ Sulphate, Pure.....	“ 3.00
Soda , Acetate.....	Per lb., 1.00
“ Arseniate.....	Per oz., .15
“ Arsenite.....	“ .10
“ Bicarbonate, Eng., Best.....	Per lb., .07
“ “ C. P., T.....	“ .60
“ Bromide.....	Per oz., .15
“ Bromide, C. P.....	Per lb., 1.50
“ Biborate, Puriss.....	“ 1.00
“ Bisulphate, Pure.....	“ .60
“ Bisulphite, C. P.....	“ 1.20
“ Carbonate, Cryst., C. P., T.....	“ .40
“ “ Dried, Puriss., T.....	“ .90
“ “ Cryst., Com.....	“ .05
“ Caustic, White, by Lime, Fused.....	“ .90
“ “ Alcohol, Dep., C. P., T.....	“ 2.00
“ “ by Sodium.....	Per oz., 1.25
“ Chlorate, Cryst.....	“ .25
“ Chloride, Sol., U. S. P.....	Per bottle .20
“ “ Dried, C. P., T.....	Per lb., .35
“ Citrate, Pure.....	Per oz., .25
“ Fluoride.....	Per oz., .75
“ Iodide, Pure, Cryst.....	“ .60
“ Hyposulphite, C. P., T.....	Per lb., .70
“ Lime, Gran., C. P., T.....	“ 1.00
“ “ Pow'd C. P., T.....	“ 1.25

Soda, Hyposulphite, Am., Opt.....	Per lb., \$	.09
“ Hypermanganate, C. P.....	Per oz.,	.10
“ Hydrosulphite. Cryst T.....	Per lb.,	.75
“ Hypophosphite.....	Per oz.,	.75
“ Iodate	“	2.00
“ Lactate, Sol., Conc.....	“	.60
“ Phosphate, Cryst., C. P. T.....	Per lb.,	.65
“ Pyrophosphate.....	“	1.30
“ Nitrate, Cryst, C. P.....	“	.35
“ “ “ Refined.....	“	.20
“ Pyrophosphate.....	Per oz.,	.10
“ Sulphite	Per lb.,	.75
“ Santonate	Per oz.,	1.50
“ Sulphocarbolate.....	“	.30
“ Silicate, Sol., 3 lb. bottles.....	Each,	.90
“ Sulphate, Com'l.....	Per lb.,	.04
“ “ Pure	“	.30
“ Tungstate.....	Per oz.,	.15
Sodium, Mett.....	“	.50
“ Bromide....C. P. T.....	“	.10
“ Nitroprusside.....	“	2.00
“ Sulphide, Fused.....	Per lb.,	.80
“ “ Cryst	“	.75
“ “ C. P.....	Per oz.,	.10
Solanine	Per dram.	5.00
Spermaceti, Pure.....	Per lb.,	.35
Spirits, Ammonia, U. S. P.....	“	.35
Strontium, Mett.....	Per gr.	.60
Strontia, Carbonate, Precc.....	Per oz.,	.10
“ Caustic	“	.30
“ Chloride, C. P., T.....	Per lb., \$1.50	.10
“ Nitrate, Dried.....	Per lb.,	.75
“ “ Cryst .C. P. T.	“	1.25
“ Sulphate. See Minerals.		
“ “ C. P. T	Per lb.,	.75
Strontianite.		
Strychnia, Cryst., Pure.....	Per oz.,	3.00
“ Acetate	“	3.50
“ Chloride.....	Per dr.,	.75

Sulphur , Flos.....	Per lb., \$	.08
“ Roll	“	.06
“ Chloride	Per oz.,	.25
“ Iodide.....	“	.45
“ Precc., Pure.....	Per lb.,	.25

T.

Tellurium , Mett.....	Per gram,	1.50
Thebaine , Pure.....	Per gr.,	.50
Theine , Pure, Alkaloid.....	Per dr.,	5.00
Thallium	Per gram,	.50
“ Chloride.....	“	.50
Thymol	Per oz.,	1.50
Test Paper , Litmus, Blue.....	Per sheet, .05, Per quire,	.80
“ “ Red.....	“ .05, “	.80
“ “ Neutral.....	“ .05, “	.80
“ Brazil Wood.....	“ .05, “	.80
“ Georgina.....	“ .06, “	1.00
“ Guaicum.....	“ .06, “	1.25
“ Turmeric.....	“ .05, “	.80
“ Sulphate, Manganese...	“ .05, “	.80
“ Schonbein's Ozone.....	Per pack,	.10
“ Hydrosulphuric Acid..	Per sheet, .05, Per quire,	.75
Tin , Mett., in bars.....	Per lb.,	.60
“ “ Pure, in sticks.....	“	2.50
“ Foil, Tissue.....	“	1.25
“ Mett., Granulated.....	“	1.25
“ Chloride, Pure, proto.....	“	.75
“ “ “ Liquid, non Aqueous.....	Per oz.,	.50
“ “ Crystals, Opt., T.....	Per lb.,	1.00
“ “ “ Com'l	“	.50
“ Oxide, Pure, T.....	“	2.00
“ Bisulphide.....	Per oz.,	.25
“ Sulphide, Proto.....	“	.20
Tungsten , Mett.....	Per gram,	.50
“ Oxide.....	“	.45
Turmeric , Pow'd.....	Per oz.,	.05
Toluol .		

U.

Uranium , Acetate, Pure, C. P.....	Per oz. \$	1.00
“ Chloride “	“	1.00
“ Nitrate.....	“	1.00
“ Sulphate.....	“	1.00
“ Oxide.....	Per oz.,	1.00
Urea , Cryst., Pure.....	“	1.25
“ Nitrate	“	1.00

V.

Vermilliontrue.....	“	.10
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Z.

Zinc , Mett.....	Per lb.	.20
“ “ Puriss, Gran'l, T.....	Per lb.,	.50
“ Acetate, Cryst., C. P.....	Per lb., \$1.00, Per oz.,	.10
“ Gran'l, Com'l.....	Per lb.,	.25
“ “ C. P., Arsenic, Free.....	“	.60
“ “ Bromide.....	Per oz.,	.45
“ Reduced, C. P., Puriss.....	Per lb.,	1.25
“ Chloride, Dry, Opt.....	Per oz.,	.10
“ Carbonate, Pure, Precc.....	Per lb., .35, Per oz.,	.05
“ Cyanide.....	“	.30
“ Ferrocyanide.....	“	.30
“ Hypophosphite.....	“	1.00
“ Iodide.....		.60
“ Lactate.....	“	.50
“ Nitrate, Pure.....	“	.30
“ Oxide, Precc.....	Per lb.,	1.25
“ Phosphate	Per oz.,	.30
“ Phosphide.....	Per oz.,	1.30
“ Sulphate, Com'l.....	Per lb.,	.10
“ “ Puriss., T.....	“	.30
“ Valerianate.....	Per oz.,	.60
Zirconium , Oxide, Pure.....	Per dr.,	.50
Zircons , Native. See Minerals.		

MINERALOGICAL AND GEOLOGICAL DEPARTMENTS.

DURING the past year, I have organized and incorporated into this establishment a Mineralogical and Geological department. My aim and desire is to furnish to those requiring them, *characteristic*, and, at the same time, *Good Cabinet Specimens*, for lecture and other purposes, at *moderate prices*; also, the usual sets and series for Students' use, Blow-pipe purposes, etc. Each specimen, without regard to size or price, will be distinctly labeled with full name and locality. Dana will be followed in all instances.

MINERALS.

3473.—A Complete Set of Minerals, with pasteboard trays for placing them in, each specimen being perfectly characteristic and illustrating all the ordinary crystalized forms in which they occur. In all, 200 specimens; size about $2\frac{1}{2} \times 2\frac{1}{2}$ inches. This series will be found to be very suitable for academies, seminaries, the smaller colleges, etc. \$50.00

3474.—A Collection similar to the above, but more complete, containing 300 specimens, $2\frac{1}{2} \times 2\frac{1}{2}$ inches, neatly and securely packed in wooden boxes; each mineral being numbered, with catalogue or same. This collection is put up and selected by a practical and experienced mineralogist, and will be found quite complete.

Packed, \$75.00

COLLECTION OF THE PRINCIPAL ORES OF THE METALS.

Aluminum—Cryolite, Alunite,

Kaolin.

Arsenic—Arsenical Iron.*Bismuth*—Carbonate Bismuth,
Native Mett.*Chromium*—Chromate of Iron*Cobalt*—Zaffre.*Columbium*—Columbite.*Copper*—Sulphide, Malachite,
Native.*Glucinum*—Beryl.*Iron*—Magnetic Oxide Hæmatite.*Lithium*—Spodumene and Lepidolite.*Lead*—Galena.*Manganese*—Pyrolusite.*Mercury*—Cinnabar.*Molybdenum*—Molybdenite.*Nickel*—Nicoliferous Pyrites.*Osmium*—Iridosmine.*Platinum*—Native Grains.*Silver*—Horn Silver.*Tin*—Stream Tin, Sulph. Tin.*Titanium*—Sphene, Rutile.*Tungsten*—Tungstate Iron.*Yttria*—Yttrotantalite.*Zirconium*—Zircon.*Zinc*—Calamine, Blende.

Price of this collection, \$15.00 to 25.00

3475.—Set of 100 Minerals, of the most commonly occurring forms, neatly packed in pasteboard trays, etc. \$15.00

3476.—Collection of Chemical substances, for beginners in Blow-piping, put up in tightly corked and correctly marked Homeopathic vials, of two drachms capacity, all C. P. Recommended by Kobel. About 50 in all, \$7.00; about 25, \$3.50

This includes a specimen of all the ordinary metals in a pure state for experimental reduction with Blow-pipe.

3477.—Blow-pipe Reagent Cases, for prospectors, mineralogists, travelers, etc.; consisting of Berzelius's Blow-pipe, with Platinum tip, Platina wire and foil, pair Pincettes, and ten of the most useful dry Blow-pipe Beagents, as follows: Borax, Boracic Acid, Oxide, Copper, Carbonate Soda, Microcosmic Salt, Fluoride Calcium, Sulphate Lime, Silicic Acid, and pure Tin. All complete, in an elegant polished mahogany case. \$7.00

3478.—The same, with the addition of one Agate Mortar, one Mineral Hammer, one Anvil, three pieces of Charcoal, six glass Tubes right size for making Blow-pipe Flasks, three glass Stirrers,—heavy glass Spirit Lamp, and four glass stoppered bottles filled with Hydrochloric, Nitric, Sulphuric Acids, and Cobalt solution. \$12.50

3479.—Ditto, ditto, ditto, with Plattner's Blow-pipe Lamp instead of Spirit Lamp. \$3.00 extra.

3480.—A Collection of minerals of most excellent size, and of a character suitable for placing on the shelves of the College Cabinet, at the uniform price of 50 cents per specimen, averaging about 3x3 inches in size. These minerals were collected by a well known mineralogist of this city, and each specimen is a perfect example of its kind. They are not completely classified, and, therefore, I will sell them singly at an extremely low figure. Some of these, for example, Kyanite, Tourmaline, Zinc Ores, etc., are really deserving of very much higher prices. The greater part of this collection is from American localities.

Agate,	Chalcedony,	Felspar,
Allanite,	Chalcopyrites, with	Fluorite,
Analcine,	Epidote,	Flint,
Apatite,	Chlorite,	Franklinite,
Asbestos,	Calcified Wood,	Flos. Ferri,
Augite,	Cinnabar,	Float Stone
Azurite,	Clay, Concretions,	Galenite,
Asphaltum,	Clintonite,	Garnets, Massive,
Arragonite,	Coccolite,	“ Rhomboidal,
Augite, Pyroxene and	Columbite,	“ Precious,
Scapolite,	Copper, Native,	Gibbsite,
Amygdaloid,	Copper, Native, with	Graphite, Massive,
Alunite,	Epidote,	“ Cryst.,
Actinolite,	Cryolite,	Gypsum, Massive,
Anhydrite,	“ with Spathic Iron,	“ Cryst.,
Anthropolite,	Copper, Native, with	Halite,
Barite,	Epidote and Ortho-	Heavy Spar,
Bismuth, Mett.	clase,	“ “ with Iron
Beryl,	Chondrodite in Cal-	Pyrites, etc.,
Blende,	cite,	Hæmatite,
Brucite,	Chlorophane,	Heulandite,
Calamine,	Chalcocite,	Hornblende, Massive,
Calcite, Ferruginous,	Dolomite,	“ Cryst.,
“ Cryst.,	Diopase,	Hornstone,
“ Massive,	Diallage,	Hypersthene,
“ Granular,	Datolite,	Hyacinth,
Cassiterite,	Emery,	Idocrase,
Celestine,	Epidote,	Ilmenite,
Cerite,	Ekelbergite,	Iron Specular,

Iron, Magnetic,	Porphyry,	Sulphur,
“ Pyrites,	Pearl. Spar,	“ with Celestine,
Jasper,	Pectolite,	Strontianite,
Jaspery Trap,	Petalite,	Sphene,
Jeffersonite,	Plumbago,	Spinel, pink and
Kaolinite,	Prase,	Chondrodite,
Kyanite,	Prehnite,	Pargasite, etc.,
Labradorite,	Pyrites, Iron,	Spinel, Black,
Lepidolite,	“ Copper,	Spathic, Iron,
Lignite,	“ Magnetic,	Steatite,
Limonite,	Pyrolusite,	Syenite,
Magnetite Cryst.,	Pyroxene,	Sunstone,
“ Massive,	Pyrrhotite,	Staurotide,
Malachite,	Quartz, Crystal,	Tabular Spar,
Marmolite,	“ Rose,	Talc,
Margarodite,	“ Smoky,	Titaniferous, Iron,
Mica, with green	“ Geodes,	Topaz,
Tourmaline.	Realgar,	Tourmaline, Massive,
Mispickel.	Rock Crystal,	“ Cryst.,
Molybdenite,	Scapolite,	“ Green,
Moscovite,	Stibnite,	Tremolite,
Natron,	Selenite,	Wad,
Obsidian,	Seyberite,	Willemite,
Olivine,	Schefeldite,	Witherite,
Opal, Common,	Smoky Quartz,	Wolframite,
“ Wood,	Serpentine,	Wood, Petrified,
“ Fine,	Silicified Wood,	“ Opal,
Orthoclase,	Silicious Sinter,	Zinc, Blende,
Orpiment,	Stilbite,	Zincite,
Pargasite,	Spodumene,	Zircon.

3481.—A Set of Minerals, for illustrating the various shades assumed by minerals when generally in crystalline state :

1. Carrara Marble,	White.	9. Dioptase,	Green.
2. Calcites,	“	10. Actinolite,	“
3. Quartz,	Gray.	11. Sulphur, Native,	Yellow.
4. Talc,	“	12. Common Opal,	“
5. Obsidian,	Black.	13. Jasper,	Red.
6. Pyroxene	“	14. Lepidolite,	“
7. Azurite,	Blue.	15. Agatized Wood	Brown.
8. Fluor Spar,	“	16. Mountain “	“

Complete, in case, \$10.00

3482.—A Collection of substances well suited to illustrate the principal Blow-pipe Reactions, neatly put up in well corked vials or specimen tubes of uniform size. Very complete. \$25.00

Carb, Soda,	Alloy, Lead and Zinc,	Molybdc Acid,
Borax,	“ Tin and Copper,	Oxide, Silver,
Micro, Salt,	Alloy, Zinc and Cad-	Binoxide, Tin,
Bisulph., Potassa,	mium,	Tungstic Acid,
Boracic Acid,	Zinc,	Sesquichloride Ura-
Fluor Spar,	Rock, Crystal,	nium,
Nitrate Cobalt,	Gypsum,	Oxide, Zinc,
Oxalate Nickel,	Calc., Spar,	Chloride, Copper,
Oxide Copper,	Strontianite	Arsenite, “
Chloride, Silver,	Witherite,	Petalite,
Lead,	Magnesite,	Hæmatite,
Iron,	Mica,	Rutile,
Tin,	Felspar,	Pyrolusite,
Bone-Ash,	Albite,	Lepidolite,
Chloride, Potassium,	Sulphides, Cu., Sb.,	Apatite,
Bromide, “	and Pb.	Franklinite,
Iodide, “	Sulphides, Arsenic,	Pitchblende,
Chloride, Sodium,	and Antimony,	Chromic Iron,
“ Ammonium,	Onofrite, or Claus-	Cerussite,
Subchl'de, Mercury,	thalite,	Malachite,
Protochloride, “	Chlorate, Potassa,	Gray Antimony,
Antimony,	Alumina,	Iron Pyrites,
Arsenic,	Sulphate, Copper,	Copper “
Bismuth,	Nitrate, Lead,	Mispickel,
Cadmium,	Oxide, Antimony,	Smaltine,
Silver,	Arsenious Acid,	Cobaltine,
Alloy, Mercury and	Ox., Bismuth,	Realgar,
Tin,	Ox., Cadmium,	Cinnabar,
Alloy, Lead and An-	Sesquichloride Chro-	Copper Nickel,
timony,	mium,	Molybdenite,
Alloy, Lead and Bis-	Ox., Cobalt,	Berthierite,
muth,	Proto-oxide, Mercury,	Tetrahedrite.

3483.—A Set for illustrating the various temperatures of fusibility of various minerals, according to Elderhorst. In case, \$1.00

- | | |
|-------------------------------|----------------|
| 1. Gray Antimony. | 4. Actinolite. |
| 2. Natrolite. | 5. Orthoclase |
| 3. Almandine, or Iron Garnet, | 6. Broncite. |

3484.—A Set of the various forms of Fossil Fuel. Price, \$3.50

- | | |
|---------------------|--------------------------|
| 1. Anthracite, | 5. Brown Coal, |
| 2. Semi-Bituminous, | 6. Lignite, |
| 3. Bituminous, | 7. Asphaltum or Bitumen, |
| 4. Petroleum, | 8. Peat. |

3485.—Series of Ten Minerals, for illustrating and testing the different degrees of hardness of minerals :

- | | |
|-----------------------------------|---------------------------------|
| 1. Talc. Foliated, | 6. Felspar, Cleavable variety, |
| 2. Rock Salt, | 7. Quartz, Transparent “ |
| 3. Calc. Spar, Transparent, | 8. Topaz, “ Crystal, |
| 4. Fluor Spar, Crystal'd variety, | 9. Sapphire, Cleavable variety. |
| 5. Apatite, Transparent Cryst. | 10. Diamond. |

Price, \$5.00. In elegant wood case, \$1.00 extra.

3486.—A Set of Minerals, for illustrating metallic color.

In case, \$3.50

- | | |
|----------------------|---------------------|
| 1. Native Copper, | 4. Native Antimony, |
| 2. Magnetic Pyrites, | 5. Galena, |
| 3. Copper Pyrites, | 6. Magnetite. |

3487.—I have a few superior specimens of that curious variety of Quartz Rock, termed Itacolumite. The shape and size of these fine examples of this mineral are just right exactly, for class exhibition, viz.: in sawed slabs, about eight and one-half inches long, two inches wide, and one and one-eighth thick. Price, each, \$2.00

3488.—A very Complete and well arranged cabinet of good sized specimens of minerals, intended for the use of Blow-pipe students and public schools, put up in sections of about fifty minerals, each section enclosed in handsome case, with movable top, with numbered catalogues. Per section, \$6.00

3489.—Ditto, ditto, consisting of full series of Rocks, of the various formations, arranged in accordance with Dana's System of Geology, with catalogue. For section of 50 specimens each, \$5.00; 10 sections, \$40.00.

3490.—A Set of Minerals, illustrating Cleavage:

- | | | |
|----------------|----------------|-------------------|
| 1. Galena, | 7. Felspar, | 13. Sulphur, |
| 2. Idocrase, | 8. Calcite, | 14. Pyromorphite, |
| 3. Tournonite, | 9. Fluor Spar, | 15. Cryolite |
| 4. Barite, | 10. Blende, | 16. Tabular Spar, |
| 5. Gypsum, | 11. Tungsten, | 17. Iceland Spar, |
| 6. Hornblende, | 12. Limonite, | 18. Rutile. |

Complete, in pasteboard case, \$10.00

3491.—A Suit of the various varieties of Mineral Oils, six specimens in all, put up in clear flint sample vials, for exhibiting to students the natural properties, color, etc., of petroleum, as found in the several localities of the United States. These samples range in specific gravity from 26 deg. Beaume to 50 deg. Beaume. \$5.00

3492.—Minerals, chiefly American, unclassified; size about $2\frac{1}{4} \times 2\frac{1}{4}$; excellent for completing amateur collections; all picked specimens; at the uniform price of, each, .25

The Calcite and Aluminous series in this selection are very well assorted, and are quite complete. Included in it are some specimens of that curious quartzose crystalization, from Bohemia, termed there, Kapp-Stein.

3493.—I have on sale a collection of Lava and Volcanic Tufa, which is, I think, worthy of considerable attention. It is a full series, from the various volcanoes in the Sandwich Islands, and was collected by Commodore Wilkes, in 1848, when there. It would be an exceedingly interesting addition to any college or private collection, possessing as it does also, great historical interest. Twenty specimens in all. \$10.00

3494.—A Suit of Colorado Minerals, including all of the ores and minerals found in this great mineral-bearing Territory. This is a quite unique and interesting little collection, suitably labeled and arranged in fine pasteboard case, with partitions and movable top 50 in all. Price, \$6.00

ELEGANT AND RARE CABINET SPECIMENS.

This part of my collection I am giving great attention, and assure my patrons that nothing under this head will be found incomplete. Included in it I may mention some extraordinarily fine and beautiful specimens of Agate, finely polished.

3495.—Splendid Falherz Specimens, from Germany.

3496.—Magnificent Fluors, from Derbyshire and Cumberland, England.

3497.—Elba Iron Ores, Götite, etc., of perfect beauty and size.

3498.—That very Rare and Exquisite, as well as wonderful, production of oceanic life, called "Venus' Flowing Basket," or "Euplectella Speciosa," found 60 fathoms deep near the Phillipine Islands,

and for a specimen of which Cummings, the great English naturalist paid, in London, £30 only six or eight years ago. \$5.00 each.

3499.—A Complete Set of Fossiliferous Rocks, of about 4 x 4 ins. in size, illustrative of the geological formations of New York. All of the New York groups and periods are fully illustrated with specimens from the principal localities in that State. Each specimen and group is characterized by its distinctive fossil or fossils. This collection of rocks has received the great approval of all the colleges who have purchased it, and is certainly deserving of notice, not only on account of its having been obtained entirely from New York State, but, also, for its completeness. It is believed to be the only collection of the kind ever put on sale in this country, and will be found to be eminently well adapted for teaching Dana's Geology in colleges, schools, etc. Carefully labeled with name of group, fossil, etc. 55 specimens in all. \$25.00

3500.—There are left at my disposal two Cabinet Collections of Minerals, belonging to gentlemen of the highest standing in the world of science, but who, for private reasons, wish to dispose of them.

Selected with rare taste and perfect mineralogical knowledge, through a long series of years, each specimen of these collections will be found to be unique examples of their class, and every class most fully illustrated. They have been gathered together from the most celebrated localities of the world, and contain specimens valued at \$250 to \$300 each.

This is a rare opportunity for colleges. Price, \$3,000 to 6,000

3501.—A Case of German Minerals, beautifully arranged, in an elegantly polished wood case, with drawers, containing 200 minerals, carefully wrapped for transportation, and completely classified and labeled; size of specimen averages about $1\frac{1}{2}$ x 2 inches

Price, with case included, \$25.00

This case would make a very useful and handsome holiday present.

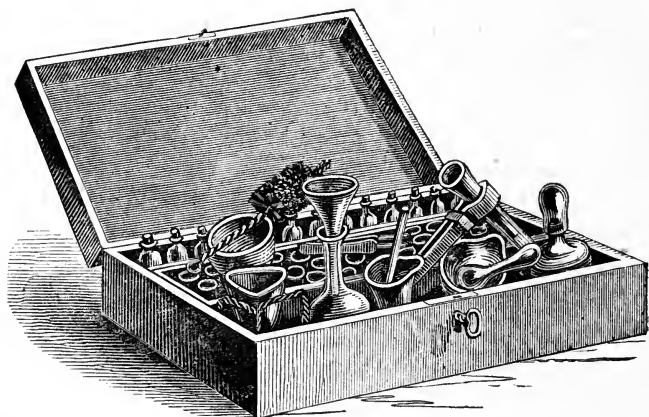
3502.—The same, as above, in all respects, except containing 150 minerals instead of 200. Price, \$20.00

3503.—The same, as above, in all respects, except containing 100 minerals instead of 150. Price, \$15.00

For the remainder of this department reference may be had to a separate Catalogue of Ward's Plaster Casts.

APPARATUS IN SETS, AND FOR SPECIAL PURPOSES.

The marginal figures in small type refer to numbers in regular catalogue.



3504

3504.—Set of Apparatus and Chemicals, for fifty initiatory experiments for boys and girls, with directions for using. These are packed in a neat wooden box, with compartments and hinged lids, and consists of the following articles. Price \$10.00

APPARATUS.

- | | |
|--|---|
| <ul style="list-style-type: none"> 1 Glass Flask, 1 oz., 1 Small Sand Crucible, 1 Shallow Sand Bath, 2 in., 1 Small Porcelain Crucible, 1 Glass Mortar and Pestle, 2 in. 2 " Stirring Rods, 1 " Spirit Lamp, 1 Small Tripod, 1 Test Glass, with lip, 4 Test Tubes, 2 Test Tube Holders, | <ul style="list-style-type: none"> 3 Test Papers, 1 each color, 50 Small Filters, cut, 1 Jeweller's Blow-pipe, 1 Corrugated Funnel, 2 in., 1 Porcelain Evaporating Dish, 3 in., 1 Piece Tin Foil, 1 " Rubber Tube, 1 Pair Iron Pincettes, 3 inches Copper Wire, 3 " Iron " 2 ft. Magnesium Ribbon. |
|--|---|

CHEMICALS.

Acid, Boracic,	Galls, Tinct.,	Manganese, Oxide,
“ Benzoic,	Gum Arabic,	Mercury, Nitrate,
“ Tartaric,	Iron Filings,	Pharaoh's Serpents,
Alum,	“ Sulphide,	Phosphuretted Oil,
Ammonia, Carbonate,	“ Sulphate,	Potash, Prussiate,
“ Chloride,	Isinglass,	Potassa, Bichromate,
“ Oxalate,	Lead, Acetate,	“ Carbonate,
Antimony, Metallic,	“ Oxide,	“ Caustic,
“ Sulphide,	Lime, Carbonate,	“ Chlorate,
Baryta, Nitrate,	“ Chloride,	“ Nitrate,
Borax,	“ Phosphate,	Potassium, Iodide,
Camphor,	Litharge,	Silver, Nitrate,
Charcoal,	Litmus,	Soda, Carbonate,
Cobalt, Chloride,	“ Paper, Red, Blue,	“ Phosphide,
Copper, Nitrate,	“ Tincture,	“ Sulphate,
“ Sulphate,	Logwood,	Strontia, Nitrate,
Fire Clay,	Lycopodium,	Turmeric Paper,
Fluor Spar,	Magnesia, Carbonate,	Zinc, Granulated,
Galena,	Magnesium, Sulphate,	“ Sulphate.

3505.—Set of Apparatus and Chemicals, according to the following list, adapted for use in ordinary schools. Price, \$10.00

APPARATUS.

1 Alcohol Lamp,	1 Test Tube Holder,	1 Pack. Cut Filters,
1 Retort Stand, 2 Rings,	1 Pneumatic Trough,	$\frac{1}{4}$ lb. Glass Tube,
3 Pint Flasks,	1 Small Porcelain Mortar,	3 ft. India Rubber Tube,
3 Quart “	2 Small Evap'ing Dishes,	1 Glass Funnel, 3 in.
6 Test Tubes, ass'd sizes,		

CHEMICALS.

1 oz. Acid, Arsenious,	2 oz. Fluor Spar,	$\frac{1}{4}$ oz. Potassium,
1 “ “ Muriatic,	$\frac{1}{4}$ “ Iodine,	1 “ “ Cyanide,
1 “ “ Nitric,	4 “ Iron, Sulphate,	$\frac{1}{2}$ “ “ Iodide,
1 “ “ Oxalic,	4 “ Lead, Acetate,	1 “ Silver, Nitrate,
1 “ “ Sulphuric,	4 “ Lime, Chloride,	2 “ Soda, Sulphate,
4 “ Alum,	1 lb. Manganese, Oxide,	$\frac{1}{4}$ “ Sodium,
4 “ Ammonia,	1 “ Mercury,	2 “ Strontia,
4 “ “ Carbonate,	1 oz. “ Chloride	4 “ Sulphur,
4 “ Ammonium, Chl'de,	$\frac{1}{2}$ “ Nut Galls,	2 “ Wax,
4 “ Antimony,	2 “ Potash, Prussiate	6 ft. Iron Wire,
4 “ “ Tartrate,	Yellow,	3 “ Magnesium Wire,
1 “ Baryta,	1 “ Ditto, ditto, Red,	1 Piece Copper,
$\frac{1}{2}$ “ Bismuth,	2 “ Potassa,	1 “ Zinc,
4 “ Borax,	2 “ “ Bichromate,	2 Sheets Litmus Paper,
1 “ Cobalt, Chloride,	4 “ “ Chlorate,	2 “ Turmeric “
4 “ Copper, Sulphate,	2 “ “ Nitrate,	1 Stick Phosphorus.

3506.—Set of Apparatus and Chemicals, the same as the foregoing, with the following additions. Price, \$15.00

APPARATUS.

1 Deflagrating Spoon,	1 India Rubber Gas-bag,	2 Stop-cocks,
1 Evolution Flask, with	1 gal.,	1 Tripod,
Funnel and Tubes,	1 Jeweller's Blow-pipe,	1 Wash Bottle.
6 ft. India Rubber Tube,		

3507.—Set of Apparatus and Chemicals, following. carefully packed in a dovetailed box, with sliding lid, and adequate to

the performance of the experiments in "Steele's Fourteen Weeks in Chemistry."

Price, \$20.00

APPARATUS.

1 Alcohol Lamp, 4 oz.,	1 Mortar and Pestle,
1 Deflagrating Spoon,	1 Ring Platinum Sponge,
2 Evaporating Dishes,	1 Stop-cock and Connector, for Gas-
1 Evolution Flask, with Funnel and	bag,
Delivery Tube,	6 Test Tubes, assorted sizes,
1 Florence Flask, with Delivery Tube,	1 Tripod,
1 Funnel, 3 in.,	2 Tubes, for Hydrogen Tones,
1 Jeweller's Blow-pipe,	$\frac{1}{4}$ lb. French Glass Tube,
1 Small Lead Tray,	1 ft. India R'r Tube, for connections.

CHEMICALS.

$\frac{1}{2}$ oz. Acid, Arsenious,	2 oz. Fluor Spar,	$\frac{1}{2}$ oz. Potash, Yellow
$\frac{1}{2}$ " Oxalic,	$\frac{1}{8}$ " Gun Cotton, for	Prussiate,
4 " Alum,	Collodion,	$\frac{1}{2}$ " " Red Prussiate,
4 " Ammonia,	$\frac{1}{8}$ " Iodine,	1 " Potassa, Bicarbon'e,
1 " Ammonium, Chl'de,	2 " Iron, Sulphate,	4 " " Chlorate,
$\frac{1}{2}$ " Antimony, Metallic,	2 " " Sulphide,	1 " " Nitrate,
$\frac{1}{4}$ " Barium, Chloride,	4 " Lead, Acetate,	$\frac{1}{2}$ " Potassium,
4 " Bleaching Powder,	1 " Litharge,	$\frac{1}{4}$ " " Iodide,
2 " Bone Black,	16 " Manganese, Oxide,	$\frac{1}{3}$ " Silver, Nitrate,
$\frac{1}{8}$ " Calcium, Phosph't,	$\frac{1}{4}$ " Mercury, Chloride,	Sol.,
Pieces,	$\frac{1}{4}$ " Nut Galls, Ground,	1 " Sodium,
$\frac{1}{4}$ " Carbon, Bisulphide,	$\frac{1}{4}$ " Phosphorus,	4 " Sulphur,
$\frac{1}{8}$ " Cobalt, Chloride,	$\frac{1}{8}$ " Platinum, Chlor'de,	2 ft. Magnesium Ribb'n,
Solution,	Sol.,	1 Specimen Metal Alu-
2 " Copper, Sulphate,	2 " Potash, Caustic,	minum,
4 " Ether, Sulphuric,	Sticks,	6 Sheets Filter Paper.

3508.—Set of Apparatus and Chemicals, to illustrate Wilson's Course in Chemistry, packed in the same manner as the foregoing.

Price, \$85.00

APPARATUS.

1 Pneumatic Trough,	1 Woulff's Bottle, 1 qt.,
1 Alcohol Lamp,	1 Nest Beakers,
1 Davy's Safety Lamp,	1 " Evaporating Dishes,
2 Bunsen Burners,	4 doz. Test Tubes, assorted,
1 Compound Blow-pipe, plain,	$\frac{1}{2}$ " Thistle "
1 Month " "	$\frac{1}{6}$ " Safety "
1 Liebig's Condenser,	1 Jar, for Iron Wire Experiments,
1 Glass Oxygen Flask,	1 Retort Stand,
3 " Retorts, each 1 pt.,	2 Rubber Bags, 8 to 15 gals.,
6 " Tall Jars,	1 " Gas-bag, 6 gals.,
2 " Receivers, each 2 qts.,	1 Piece Brass Wire Gauze, 6 ins. sq.,
12 " Flasks asso'd sizes, 4 to 16 ozs ,	1 " Platinum Foil,
4 " Funnels, assorted,	1 yd. " Wire,
2 lb. Glass Tube,	4 yds. $\frac{3}{8}$ ins Rubber Tube,
1 " " Rods,	3 Deflagrating Spoons,
1 Graduate, 4 ozs.,	3 Packs Filter Paper.
2 Pouring Glasses,	

CHEMICALS.

Acid, Arsenious,	Ammonia,	Bismuth,
" Muriatric,	" Carbonate,	Borax,
" Nitric,	Ammonium, Chloride,	Cobalt, Chloride,
" Oxalic,	Antimony,	Copper,
" Sulphuric,	" Tartrate	Copper, Sulphate,
Alum,	Baryta, Nitrate,	Fluor Spar,

CHEMICALS.—*Continued.*

Iodine,	Nut Galls,	Potassium, Iodide,
Iron,	Phosphorus,	Silver, Nitrate,
“ Sulphate,	Potash,	Soda, Sulphate,
Lead, Acetate,	Potassa, Bichromate,	Sodium,
Lime, Chloride,	“ Chlorate,	Strontia, Nitrate,
Litmus Paper,	“ Nitrate,	Sulphur,
Magnesium,	Potassium,	Turneric Paper,
Manganese, Oxide,	“ Cyanide,	Wax,
Mercury,	“ Ferricyanide,	Zinc.
“ Chloride,	“ Ferrocyanide,	

3509.—Set of Apparatus, to be used in illustrating Barker's Text Book of Inorganic Chemistry, packed in the same manner as the last. Price, \$100.00

1942. $\frac{1}{2}$ doz. Glass Cylinders, 12 in., <i>Fig. 10, p. 103,</i>	3016. 1 Tubulated Retort and Receiver, pint,
1516. $\frac{1}{2}$ “ Saltmouths, assorted,	“ 1 “ “ “ $\frac{1}{2}$ “
2276. $\frac{1}{2}$ “ Flasks, $\frac{1}{2}$ pint,	2054. 1 Metal or Glass Cistern,
2322. $\frac{1}{2}$ “ Funnels, assorted,	1 Porcelain Cistern, <i>Fig. 15, p.</i>
1540. “ Would's Bottles, $\frac{1}{2}$ pint,	117,
1538. “ Would's Bottles, 2 necks,	1 Adjustable Clamp, <i>Fig. 15, p.</i>
1446. $\frac{1}{3}$ “ Bell Glasses, 1 pt., 2 qts., 1½ gals.,	117,
1453. $\frac{1}{6}$ “ Stopped Bell Jars, quart,	1971, '72, '74. 1 Phosphorus Tripod Ap- paratus, <i>Fig. 17, p. 119.</i>
3262. $\frac{1}{2}$ “ Conical Test Glasses,	1478. 1 Compound Blow-pipe,
3269. 1 “ Test Tubes, 5 in.,	3108. 1 Wire Ganze Cage, <i>Fig. 1, p. 91,</i>
3269. 1 “ “ 6 in.,	1960. 1 Safety Lamp,
3364. $\frac{1}{4}$ “ U Tubes,	3186. 1 Gas Furnace, <i>Fig. 7, p. 98,</i>
3265. $\frac{1}{4}$ “ Bulb “	1602. 2 Bunsen Burners,
2331. $\frac{1}{4}$ “ Funnel Tubes,	3234. 2 Retort Stands,
2335. “ Safety “ <i>Fig. 11, p. 104,</i>	3066. 4 Iron Sand Baths,
1469. “ Combustion Spoons,	1969. 6 Combustion Spoons, with cov'rs,
2907. $\frac{1}{6}$ “ Pipettes,	3226. 1 Test Tube Rack,
2402. 1 Hydrogen Generator,	1405. 1 Hydrogen Balloon.
2397. 1 Sulphuretted “ “	2382, 2383. 1 Two-Gallon Gas-bag, with Stop-cock.
2203. 1 Eudiometer, straight tube,	2221. 1 Nest Evaporating Dishes,
2204. 1 “ Ure's,	1422. 1 “ Beakers, from 1 qt. down,
2189. 1 Diffusion Apparatus, <i>Fig. 3, p. 92,</i>	1899. 1 “ Hessian Crucibles,
1714. 1 Calcium Chloride Tube, <i>Fig. 6,</i> <i>p. 97,</i>	1885. $\frac{1}{4}$ doz. Porcelain Crucibles, with covers.
2862. 1 Siemen's Tube for Ozone,	3378. 1 lb. Glass Tube, assorted,
1 Apparatus for Decomposition of Water,	3387. 8 ft. Rubber “ “
1452. 1 Copper Bell Glass, with Stop- cock,	2938. 3 ft. Platinum Blow-pipe Wire, $\frac{1}{2}$ oz. Platinized Asbestos. See Chemicals.
2055. 1 Drying Bottle, <i>Fig. 7, p. 98,</i>	

3510.—Set of Apparatus, arranged for the purpose of illustrating a short course of Popular Lectures. Price, \$200.00

2827. 1 Porcelain Mortar, 3½ in.,	3080. 1 pr. Trimming Scissors,
“ 1 “ “ 5 “	3321. 1 “ Small Tongs, with bent ends,
2822. 1 Iron, “ 6 “	1750. 1 “ Tube Tongs, wood,
2598. 1 Glass Spirit Lamp,	3319. 1 “ Charcoal Tongs,
2614. 1 doz. Wicks for ditto,	3322. 1 “ Steel Crucible ditto,
2035. 1 Porcelain Dome for ditto,	2303. 1 “ Platinum Pointed Forceps,
2590. 1 Brass Argand Spirit ditto,	2276. $\frac{1}{4}$ doz. Glass Flasks, 4 oz.,
2614. 1 doz. Wicks for ditto,	“ $\frac{1}{4}$ “ “ “ 8 “
2586. 1 Blow-pipe Spirit ditto,	“ $\frac{1}{4}$ “ “ “ 16 “

APPARATUS.—*Continued.*

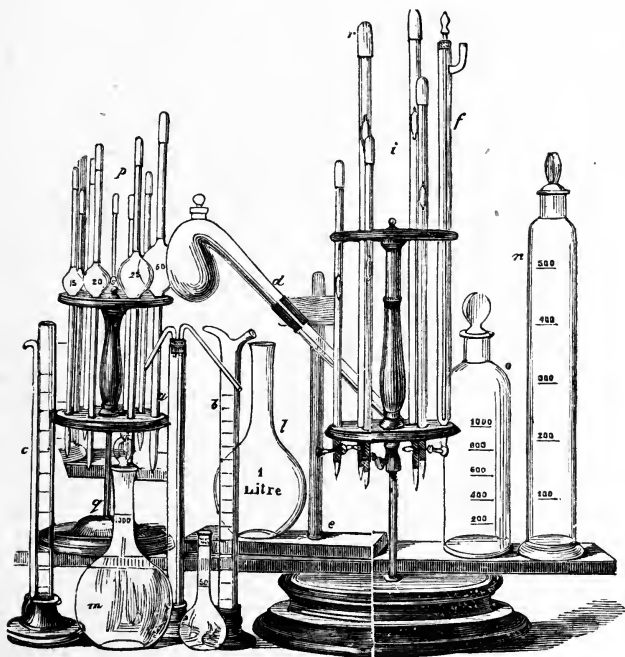
2276. 2 Glass Flasks, 32 oz.,
 2233. 1 " with Delivery Tube,
 " 1 Evolution flask, with Delivery
 Tube,
 3027. 3 Plain Retorts, 4 oz.,
 " 3 " " 8 "
 " 3 " " 16 "
 3031. 2 Clark's Retorts,
 3040. 1 Oxygen " quart,
 3033. 2 Tubulated Stoppered Retorts,
 8 oz.,
 " 2 Ditto, ditto, ditto, 16 oz.,
 " 2 Ditto, ditto, ditto, 32 "
 3016. 2 Ditto, ditto, Receivers, 4 oz.,
 " 2 Ditto, ditto, ditto, 8 "
 " 2 Ditto, ditto, ditto, 16 "
 3234. 1 Iron Retort Stand, with 3 Rings,
 1422. 1 Nest Beakers, plain, Nos. 0 to 8,
 1434. 1 " " lipped, 1 to 5,
 3269. 3 doz. Test Tubes, 5 in.,
 " 3 " " 6 "
 1575. $\frac{1}{2}$ " " Brushes,
 3274. $\frac{1}{4}$ " " Holders,
 1 Nickel Plated Test Spoon,
 3278. 2 Porcelain Test Plates,
 3262. 2 Conical Test Glasses, 2 oz.,
 " 2 " " 4 "
 " 2 " " 8 "
 3226. 1 Test Tube Rack,
 3367. 1 doz. Sheets Test Paper, each
 Red, Blue and Yellow,
 1 Collection Test Metals. See
 Minerals.
 2357. 1 Hand Furnace, Clay, with Iron
 Binding,
 3353. 1 Tripod Support,
 3215. 2 Table Supports, with Fork and
 Pins,
 3206. 1 Hinged Wood Clamp Support,
 3237. 1 Shelbach's Support, with Iron
 Foot,
 2322. $\frac{1}{2}$ doz. Glass Funnels, assorted,
 2335. 2 Safety " "
 2331. 1 Com. Filtering ditto,
 2216. 2 Filter Dryers,
 3255. 1 Pack Filters to fit Funnels,
 3216. 1 Wood Filter Stand, with 1 arm,
 3218. 1 " " " 2 "
 2251. 2 Porcelain Filter Rings, each
 with 3 arms,
 2442. 1 Graduated Measure, 4 oz.,
 1 " " 8 "
 1 " " 16 "
 2440. 1 Minim Glass,
 3065. 1 Deep Sand Bath, 7 in.,
 3066. 1 Shallow " 6 "
 1280. 1 Air Globe, 1 gal.,
 1971. 1 Deflagrating Globe, 2 gals.,
 1966. 1 " Spoon,
 1 " Cap,
 2039. 1 Schuster's Dropping Bottle,
 plain,
 2040. 1 Ditto, ditto, ditto, stoppered,
 3406. 1 Washing Bottle, pint,
 " 1 " " quart,
 1542. 2 Woulff's Bottles, 3 necks,
 1519. 2 Bottles, with glass stoppers, for
 Distilled Water,
 1519. 3 Ditto, ditto, ditto, quarts,
 1519. 3 Ditto, ditto, ditto, $\frac{1}{2}$ gal.,
 1524. 1 doz. Ditto, ditto, ditto, 8 oz.,
 1524. 1 " Ditto, ditto, ditto, 16 oz.,
 1532. 1 Bottle, for Chlorine,
 3164. 1 doz. Glass Stirrers, 3 in.,
 3164. $\frac{1}{2}$ " " 6 "
 3164. $\frac{1}{2}$ " " 9 "
 2906. $\frac{1}{4}$ Straight Pipettes,
 2907. $\frac{1}{4}$ Bulbed "
 2955. 1 Japanned Pneumatic Trough,
 12x15.
 2671. 1 Mercury Trough, 10 lbs,
 3378. 2 lbs. Glass Tubing, assorted,
 3387. 6 ft. Rubber Tubing,
 2333. $\frac{1}{2}$ doz. Funnel Tubes,
 1356. 1 " Arsenic "
 3022. $\frac{1}{6}$ " Reduction " with 1 Bulb,
 3023. " " " 2 "
 3358. 1 Set Tubes for Hydrogen Tones,
 1583. 1 Pipe for Hydrogen Bubbles,
 1405. 1 Small " Balloon,
 2402. 1 Glass " Generator,
 2220. 2 Sets common Evaporating
 Dishes, with lips,
 2225. 1 Porcelain ditto, 6 in.,
 2225. 1 " " 10 "
 2225. 1 " " 12 "
 2216. 1 Set Royal Berlin Evaporating
 Dishes, small, shallow,
 1885. $\frac{1}{4}$ Doz., ditto, Crucibles, No. 2.
 1897. 1 Nest of 5 Hessian "
 1893. 1 Platinum Crucible,
 3408. $\frac{1}{2}$ doz. Watch Glasses, 3 in.,
 3408. $\frac{1}{2}$ " " " 4 "
 3408. $\frac{1}{2}$ " " " 5 "
 3409. 1 " " Springs,
 1690. 3 Small, shallow R. B. Casseroles,
 1687. 1 Semi-Berlin Casseroles, 4 in.,
 1687. 1 " " " 6 "
 2002. 6 Assorted Porcelain Digesters,
 1283 '84. 3 " Glass Adapters,
 1942. 6 " " Cylinders, with
 Ground Tops,
 1446. $\frac{1}{4}$ doz. Bell Jars, pints,
 1446. $\frac{1}{4}$ " " quarts,
 1448. 1 Bell Jar, with Glass Foot, 6 x
 12 in.,
 1452. 1 Bell Jar, with Brass Cup, Stop-
 cock and Connecting Tube,
 2550. 3 Specie Jars, with Ground Tops,
 $\frac{1}{2}$ gal.,
 " 6 Ditto, ditto, ditto, ditto, 1 gal.,
 1486. 1 Berzelius, Blow-pipe,
 1848. 1 Gross Assorted Corks,
 1851. Set of 12 " Corkborers,

APPARATUS.—*Continued.*

- | | |
|---------------------------------------|---|
| 2024. 1 Still and Worm, 2 gals.. | 3256. 3 Tapers, mounted on Wires, |
| 2400. 2 Sets of Von Babo's Apparatus | 1864. $\frac{1}{2}$ doz. Glass Covers for Jars, |
| for evolving Sulphuretted | 3237. 1 Triangular File, |
| Hydrogen, | 3236. 1 Semicircular " |
| 2382. 2 Five-gallon Gas-bags, fitted, | " 1 Rat's Tail " 4 in., |
| 2417. 3 Assorted Gas Tubes, | " 1 " " 6 " |
| 1441. 1 Small Beehive Shelf | 2578. 2 Sets Chemical Labels. |
| 3341. 1 Lead Tray, | |

N. B.—When gas is employed in the place of alcohol, gas-burners, with rubber connections, may be substituted for the spirit lamps at a small increase of cost.

A set of chemicals, adequate to the performance of experiments with the foregoing apparatus, can be supplied for about \$25.00.



3511

3511.—Set of Apparatus, for conducting operations in Volumetric Analysis. Price, \$60.00

No notice is taken, in this list, of instruments which are not volumetric; such as Balances, Weights, Boiling Flasks, Gas-burners, etc. Full information respecting such instruments may be found in other sections of this work.

- | | |
|--|---|
| 1590. 1 Mohr's Burette, 100 c.c., in halves, | 1591. 1 Ditto, ditto, 50 c.c., in tenths, |
| " 2 Ditto, ditto, 50 c.c., in fifths, | with Stopcock, |
| " 1 Ditto, ditto, 25 c.c., in tenths, | 1587. 1 Bink's Burette, 100 c.c., |
| | 3207. 1 Wood Support for 4 Burettes, |

APPARATUS.—*Continued.*

- | | |
|--|---|
| 3204. 1 Brass Support for 2 Burettes, | 1946. 1 Graduated Cylinder, 1,000 c.c., |
| 1597. 5 Erdman's Floats to fit ditto, | 2693. 1 Mixing Jar, stopper'd, 1,000 c.c., |
| 2913. 1 Graduated Pipette, 100 c.c., in ones, | 2692. 1 " Bottle, 1,000 c.c., |
| " 1 Ditto, ditto, 50 c.c., in fifths, | 3278. 1 Porcelain Slab, 5 in., |
| " 1 Ditto, ditto, 10 c.c., in fifths, | 1333. 1 Alkalimeter, for Chameleon Test, |
| " 1 Ditto, ditto, 5 c.c., in tenths, | 2924. 2 Porous Plates, for Drying Precipitates, |
| 2907. 2 Bulbed Pipettes, | 1420. 1 Set of six Beakers, |
| 2899. 4 Spring Clamps, with Tips, | 3262. $\frac{1}{2}$ doz. Test Glasses, $\frac{1}{2}$ oz., |
| 1946. 1 Graduated Cylinder, with Lip, 50 c.c., | 3164. 1 " Stirring Rods, |
| " 1 Ditto, ditto, with ditto, 100 c.c., | 2318. $\frac{1}{2}$ " Glass Funnels, 1 to 4 in., |
| " 1 Ditto, ditto, ditto, 250 c.c., | 3378. $\frac{1}{2}$ lb. Glass Tubing. |
| " 1 Ditto, ditto, ditto, 500 c.c., | 3267. 1 doz. Test Papers, each color, |
| | 2265. $\frac{1}{2}$ quire Swedish paper. |

3512.—Set of Apparatus and Chemicals, for the performance of experiments in Agricultural Chemistry. Price, \$65.00

APPARATUS.

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|--|--|
| 1399. 1 Small Balance for Grain w'ts, | 2970. 1 Conical Jar, tall, 4 oz., |
| 2827. 1 Porcelain Mortar, No. 8, | 3262. 3 " Test Glasses, assorted. small, |
| 3410. 1 Copper Water Bath, | 3226. 3269. 1 Test Tube Stand, filled, |
| 3066. 1 Iron Sand Bath, 5 in., | 3274. 2 Test Tube Holders, wood, |
| 2598. 1 Glass Spirit Lamp, 4 oz., | 2322. 1 Glass Furnel, 2 inches, |
| 2615. 3 ft. of Wick for the same, | " 1 " " 2 $\frac{1}{2}$ " |
| 2442. 1 Graduated Measure, 1 oz., | " 1 " " 3 " |
| 2279. 3 French Flasks, 4 oz., | 1897. 1 Sand Crucible, No. 0. |
| " 3 " " 8 oz., | " 1 " " No. 1. |
| 2276. 3 Bohemian " 8 oz., | " 1 " " No. 2. |
| " 3 " " 16 oz., | 2255. 1 Pack Filters, 5 in., |
| 2389. 1 Evolution " with Delivery Tube, pint, | " 1 " " 6 in., |
| " 1 Glass ditto, with ditto, | " 1 " " 7 in., |
| 3040. 1 Oxygen Retort, quart, | 3217. 1 Filter Stand, |
| 2402. 1 Hydrogen Generator, | 14-3. 1 Black's Blow-pipe, |
| 1943. 1 Cylinder, with Lip and Glass Foot, 2x12 in., | 2925. 1 Small Platinum Capsule, $\frac{1}{4}$ oz., |
| 1446. 1 Knobbed Bell Jar, pint, | 3125. 1 " Steel Spatula, |
| " 1 " " quart, | 3321. 1 pair Japanned Tongs, |
| 1453. 1 Stoppered " " " | 3155. 1 Horn Spoon, |
| " 1 " " gallon, | 3350. 1 Porcelain Triangle, |
| 1687. 1 Porcelain Casserole, | 3164. $\frac{1}{2}$ doz. Stirring Rods. |
| 2002. 1 " Digester, | 3407. 1 pair Watch Glasses, |
| 3033. 1 Stoppered Retort, 4 oz., | 1755. 1 Watch Glass Holder, |
| 3027. 1 Plain Retort, 4 oz., | 2-68. $\frac{1}{2}$ doz. Sheets Litmus Paper, each color, |
| 1 Brass Retort Stand, | 1516. $\frac{1}{4}$ doz. Salt-Mouths, 1 oz., |
| 1971. 1 Deflagrating Globe, 1 gallon, | 1517. $\frac{1}{4}$ " Tinctures, 1 oz., |
| 1966. 1 " Spoon and Cover, | 1504. 1 $\frac{1}{2}$ doz. Packing Bottles, corked, 2 oz., |
| 2222. 6 Semi-Porcelain Deep Evaporating Dishes, | " 1 " Ditto, ditto, ditto, 4 oz., |
| 2210. 2 Berlin ditto, about 8 in., | 2935. 1 Specimen Platinum Foil, |
| " 2 ditto ditto, " 10 " | 2938. 1 " Wire. |

CHEMICALS.

- | | | |
|-------------------------------|-------------------------------|-----------------------------------|
| 1 oz. Acid, Acetic, | 3 oz. Ammonium Chloride, | 2 oz. Copper, Bl'k Oxide, |
| 1 $\frac{1}{2}$ " " Tartaric, | 2 " Barium, Chloride, | 2 " Iron, Proto-Sulphate, |
| 4 " Alum, Crystals, | 2 " " Nitrate, | 4 " " Sulphide, |
| 1 " Ammonia, Carbonate, | 4 " Calcium, Chloride, Fused, | $\frac{1}{2}$ " Magnesia, Calc'd, |
| 2 " " Nitrate, | 4 " " Hydrate, | 4 " " Sulphate, |
| 1 " " Oxalate, | | |

CHEMICALS.—*Continued.*

8 oz. Manganese, Per- Oxide,	1 oz. Potassa, Carb'e,	1 oz. Soda, Biborate,
1 " Mercury, Red Ox- ide,	4 " " Chlorate,	1½ " " Carbonate,
¼ " Phosphorus,	1 " " Hydrate,	1 " " Phosphate,
	4 " " Nitrate,	6 " Zinc, Granulated.
	3 " Silica, in powder,	

3513.—List of Apparatus, for use in the Volumetric Analysis of Urine. Price, \$20.00

1590. 1 Mohr's Burette,	2322. 1 Glass Funnel 2½ in.,
3206. 1 Burette Support,	2255. 1 Pack Filters for each size,
2599. 1 Clamp and Tip, with Rubber Attachment.	3216. 1 Funnel Holder,
2913. 1 Graduated Pipette, 25 c.c. in fifths,	3262. ½ doz. Test Glasses, ½ oz.,
" 1 ditto ditto, 25 c.c. in tenths,	" ½ " " 1 oz.,
1946. 1 ditto Cylinder, 500 c.c. lipped,	3269. ½ " " Test Tubes, with wide mouths for Hydrometer,
2909. 3 Fixed Pipettes, ass'd, 5 to 20,	3226. 1 Support for ditto,
2906. 3 Straight " for decanting,	1420. 1 Set of six Beakers,
2276. 1 Bohemian Flask, wide mouth, ½ pint,	1438. 1 Beaker Flask,
" 1 " " 8 oz.,	3278. 1 Porcelain Slab, 6 in.,
" 1 " " 16 "	2922. ½ doz. Porcelain Plates for Indi- cating Test,
" 1 " " 25 "	2634. 1 doz. Sheets Litmus paper, each color,
2636. 1 Litre " "	1519. 1 Bottle for Litmus Tincture,
" 1 quart'r Litre "	3406. 1 Wash Bottle, pint,
2322. 1 Glass Funnel, 1½ in.,	3164. ½ doz. Glass Stirrers, 6 inch.
" 1 " " 2 "	

3514.—Set of Apparatus and Chemically Pure Tests, for use in the Qualitative Analysis of Urinary Deposits. Price, \$37.50

APPARATUS.

1400. 1 Balance, with Weights,	3321. 1 pr. Tongs for holding the same
2598. 1 Spirit Lamp,	1675. 3 Porcelain Capsules, assorted,
2615. 1 yard Lamp Wick,	3269. 8 Test Tubes, 6 in.,
1644. 1 Lamp Cylinder,	3269. 2 " " 4x1 in.,
3233. 1 Iron Stand, with 2 Rings,	3267. 3 doz. Assorted Test Papers,
3066. 1 Sand Bath,	2322. 1 Glass Funnel, 2 in.,
3410. 1 Water " "	2255. 1 Pack Filters, to fit the same,
3353. 1 Tripod,	3164. 3 Glass Stirrers,
3461. 1 sq. ft. Wire Gauze,	3104. 4 " Slides,
2518, '19. 1 Urinometer, with Solution Tube,	3407. 3 Watch Glasses,
1885. 1 Porcelain Crucible, No 1,	2440. 1 Graduated Minim Glass,
2925. 1 Platinum Capsule, ¼ oz.,	2906. 2 Straight Pipettes, 6 in.

CHEMICALS.

8 oz. Acid, Acetic,	2 oz. Ammonia, Oxalate,	4 oz. Copper, Sulphate,
8 " " Hydrochloric,	8 " " Spirits,	½ " Silver, Nitrate,
8 " " Nitric,	2 " Baryta, Nitrate,	1 " Zinc, Chloride, fus'd.
2 " Ammonia Carbonate	4 " Potash, Caustic Sol.	

3515.—Apparatus, for Qualitative Chemical Analysis.

Price, \$50.00

2829. 1 Porcelain Mortar, 2½ in.,	1644. 1 Lamp Cylinder Furnace,
2599. 1 Spirit Lamp, 3 oz.,	3351. ½ doz. Wire Triangles,
2615. 1 yd. Wick for ditto,	3066. 1 Five-inch Sand Bath,
3080. 1 pr. Trimming Scissors,	1885. 1 Porcelain Crucible, 1 in.,
3350. 2 Porcelain Triangles,	2424. 1 sq. ft. Iron Wire Gauze,

APPARATUS.—*Continued.*

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|---|---|
| <p>3234. 1 Iron Retort Stand, with 3 Iron Rings,
 2424. 1 Coarse Wire Netting for supporting Tubes when in the Sand Bath,
 2003. 1 Porcelain Digester,
 3323. 1 pr. Steel Crucible Tongs,
 1671. 6 Small Evaporating Capsules, plain, glazed both sides,
 2276. 1 Cooking Flask, each 2, 4, 6 oz.,
 1419. 1 Nest Beakers, 1 to 5,
 3027. 1 4-oz. Retort, plain,
 3033. 1 " " stoppered,
 3014. 1 " Tubulated Receiver,
 3331. 1 Clark's Retort,
 3217. 1 Funnel Holder,
 3164. 1 doz. Glass Stirrers, 3 in.,
 " $\frac{1}{2}$ " Ditto, ditto, each 6 and 9 in.,
 2318. 1 Glass Funnel, each 2, 2$\frac{1}{2}$, 3 in.,
 2255. 1 Pack Filters, each size to fit above,
 3226. 1 Test Tube Stand, filled,
 2221. $\frac{1}{2}$ doz. Semi-Berlin Evaporating Dishes, a set,
 3407. 1 pr. Watch Glasses, 2 in.,</p> | <p>1755. 1 Watch Glass Holder,
 1690. 1 Small Royal Berlin Casserole,
 3462. $\frac{1}{2}$ doz. $\frac{1}{2}$-oz. Test Glasses,
 2906. $\frac{1}{2}$ " Straight Pipettes, 6 in.,
 2907. 2 Cylinder " " 1 Bulb " "
 3259. 1 doz. 6-in. Test Tubes,
 " 3 Test Tubes, 2 in high, 1 in. wide,
 3378. 1 lb. Glass Tubing, $\frac{3}{4}$-in. bore,
 3274. 2 Wooden Test Tube Holders,
 1575. 2 Test Tube Brushes,
 3406. 1 Wash Bottle, pint,
 3387. 1 ft. Rubber Tubing,
 2039. 1 Shuster's Alkalimeter, plain,
 6 Pieces of ordinary Glass, 4x6 in.,
 3267. 6 Sheets Test Paper, assorted,
 1 Small collection of Test Metals, for Precipitating,
 2233. 1 Evolution Flask and Delivery Tube,
 2427. 1 Plate Cobalt Glass,
 1 Hollow Glass Prism, small,
 3278. 1 Flat Testing Slab,
 2924. 2 Porous Plates, for drying Precipitates,</p> |
|---|---|

A collection of forty Reagents can be included in the above, in bottles, if required, at reasonable prices.

3516.—Apparatus for Physicians, for Medical Tests. \$125.00

- | | |
|---|--|
| <p>2829. 1 Small Porcelain Mortar, No. 0,
 3125. 1 4-in. Steel Spatula,
 1400. 1 Apothecaries Balance, small,
 3451. 1 Set Grain Weights, for ditto,
 2439. 1 Graduate, 1 oz.,
 2598. 1 4-oz Spirit Lamp,
 2615. 1 yard Wick for ditto,
 3352 or '53. 1 Tripod,
 3234. 1 Retort Stand, with 3 Rings,
 3066. 1 5-in. Sand Bath,
 2424. 1 Coarse Wire Gauze, for supporting Tubes,
 3351. 6 Wire Triangles,
 2424. 1 sq. ft. Iron Wire Gauze,
 1486. 1 Berzelius' Blow-pipe,
 1494. 1 Plattner's Blow-pipe Lamp, on Stand,
 1704. 4 pieces Prepared Charcoal,
 1705. 1 Charcoal Support,
 2938. 1 ft. Blow-pipe Platinum Wire,
 2935. 1 sq. in. Platinum Foil,
 2940. 1 Plat. Crucible, with cover, $\frac{1}{2}$ oz.,
 2925. 1 Platinum Capsule, $\frac{1}{2}$ oz.,
 3455. 3 ft. Fine Copper Wire,
 2303. 1 pr. Platinum pointed Forceps,
 2928. 1 Platinum Spoon,
 2308. 1 pr. Blow-pipe Tongs, with Platinum Points,
 2298. 1 pr. Steel Forceps,
 3080. 1 pr. Scissors,
 3149. 1 Brass Weighing Spoon,
 1344. 1 Blow-pipe Anvii,</p> | <p>2447. 1 Blow-pipe Hammer,
 1356. 4 large Bulb Tubes, Arsenic, Clark's,
 2276. 4 Glass Flasks, 1 each, 2, 4, 6, 8 oz.,
 3268. $\frac{1}{2}$ doz. Hard Bohemian Test Tubes for Reductions,
 1434. 1 set Lipped Beakers, 1 to 5,
 1420. 1 " Beakers, 0 to 5,
 3408. 2 Watch Glasses, 3 in.,
 2205. 1 set Bohemian Glass Evaporators, plain,
 1755. 1 Watch Glass H'der, Hoffmann's,
 1756. 1 " " " Mohr's,
 3269. 1 doz. Test Tubes, each 3 and 5 in.,
 3269. $\frac{1}{2}$ " " " 3 in. wide,
 1749. 2 Wooden Test Tube Holders,
 3227. 1 Mahogany Test Tube Stand, small, with Drying Pins,
 3271. 1 nest of Test Tubes, in paste-board box,
 2002, '4, '5. 1 doz. Porcelain Digesters, assorted,
 3262. $\frac{1}{2}$ doz. 1 oz. Test Glasses,
 3164. $\frac{1}{2}$ " Stirring Rods, ea. 3 & 6 in.,
 2906. $\frac{1}{2}$ " Plain Straight Pipettes, 5 or 6 in.,
 2907. 1 Bulb Pipette,
 2969. 1 " " Bent Top,
 3378. $\frac{1}{2}$ lb. Glass Tubing,
 2318. 1 Glass Funnel, ea. 1$\frac{1}{2}$, 2, 2$\frac{1}{2}$, 3 in.,
 2255. 1 Pack of Filters for each size,
 3217. 1 Wood Funnel Holder,</p> |
|---|--|

APPARATUS.—*Continued.*

2251. 2 Porcelain Filter Rings, 3 arms,	1885. 1 Porcelain Crucible, with Covers,
2246. 1 Filter Dryer,	each 00, 0, 1, 2, 3,
3406. 8 oz. Wash Bottle,	1350. 1 Marsh's Arsenic Apparatus,
3408. 3 Glass Covers, 3 in.,	complete,
2924. 2 Porous Plates.	1356. 2 doz. Assorted Arsenic Tubes,
1 Small Collection of Test Metals,	2233. 1 Evolution Flask and Delivery
2634. 1 doz. sheets Litmus Paper, each	Tube,
Red and Blue,	3031. 1 Clark's Retort,
3278. 2 White Glazed Porcelain Slabs,	3033. 1 4 oz. Stopped Retort,
2211. 1 set Royal Berlin, Small, Eva-	1542. 1 8 oz. Woulf's Bottle, fitted Rub-
porating Dishes,	ber Corks.
2210. 4 ditto ditto, No. 6,	

The following bottles, containing Chemicals, as below :

1524. Tinctures, 8 1-oz., 14 3-oz., 3 4-oz.,	1516. Salt-Mouths, 16 $\frac{1}{2}$ -oz., 7 4-oz.
6 8-oz.,	

CHEMICALS.

4 oz. Acid Acetic,	1 Piece Copper Foil, 3x3	1 oz. Potass. Sulphoc'yde,
2 " " Tartaric,	in., pure,	1 " " Carbonate,
2 " " Oxalic,	4 oz. Ferrous Sulphide,	1 " " Cyanide,
6 " Barium Chloride,	8 " " Sulphate,	1 " Silver Amm'd Sol.,
4 " " Nitrate,	1 " Indigo,	$\frac{1}{2}$ " Ditto Nitrate, cryst.,
2 " Cobalt Sol.	4 " Charcoal, Powdered,	1 " Zinc, Chloride,
4 " Ammonia C'bonate,	4 " Ferric Chloride,	$\frac{1}{2}$ lb. " Pure, in Sticks,
4 " " Chloride,	4 " Flux Black,	4 oz. Potass. Ferroc'yde,
4 " " Oxalate,	8 " Lead Acetate,	2 " " Ferridc'yde,
4 " " Sulphide,	2 " Mercury Chloride,	2 " " Hydrate,
6 " Calcium, Chloride,	2 lb. Manganese, Oxide,	1 " " Iodide,
1 lb. " Sulphate,	$\frac{1}{2}$ oz. Platinum, Chloride,	4 " " Nitrate,
1 oz. Copper Ammoniated	Sol,	8 " Sodium, Carbonate,
Sulphate,	$\frac{1}{2}$ lb. Potass. Bichromate,	2 " " Phosphate,
1 lb. Copper Sulphate,	2 oz. " Ferrieyanide,	3 " Tin, Chloride.

3517.—Apparatus, for Miners and Engineers. Price, \$105.00

1 Small Cheap Balance and Set	2938. 2 ft. Platinum Blow-pipe Wire,
of Grain Weights.	2935. 1 sq. in. " Foil,
2439. 1 2-oz. Graduate,	2925. 2 Small Platinum Capsules.
1998. 1 Steel Crushing Mortar,	2305. 1 pr. " " Pointed Tongs,
2818. 1 2-in. Agate " "	3455. 1 yd. Copper Wire,
3827. 1 3-in. Porcelain Mixing Mortar,	1701. 1 doz. Blocks Prep'd Charcoal,
3125. 1 Steel Spatula, each 4 and 6 in.,	1 Bottle Charcoal Powder, 16 oz.,
2237. 1 Triangular File, in handle,	1 " Rice Flour, 4 oz.,
2236. 1 Round " "	2833. 1 Mould for Pastiles,
" 1 Half Round File,	3351. 1 Small Wire Triangle,
2599. 1 Glass Spirit Lamp, 3 oz.,	3278. 2 5-in. Porcelain Plates,
2615. 1 yd. Wick for same,	3269. 1 doz. Narrow Test Tubes, 3 in.,
3080. 1 pr. Trimming Scissors,	3371. 1 " Small Specimen Tubes,
3321. 1 " Japanned Tongs,	corked,
3234. 1 Iron Retort Stand, with 3 Rings,	2621. 1 Magnifying Lens, in horn case,
1885. 1 Porcelain Crucible, each 0 No. 1.	3378. 1 lb. Glass Tubing $\frac{1}{8}$ in. bore,
2002, 2005. 8 Assorted Porcelain Di-	3333. 1 pr. Cupel Tongs,
gesters,	1356. 1 doz. Assorted Tubes, Liebig's
1488. 1 Berzelius's Brass Blow-pipe,	form,
with extra Jet,	1432. 1 Set 3-lipped Beakers,
2940. 1 Platinum Crucible, $\frac{1}{2}$ oz.,	1421. 1 " of 6 " 0 to 6, plain,
2604. 1 Plattner's Blow-pipe, Lamp and	2276. $\frac{1}{2}$ doz. Flasks, assorted, 2 to 6 oz.,
Stand,	3407. 2 Watch Glasses, 2 in.,
1344, 2446. 1 Anvil and Hammer,	1755. 1 Hoffman's Glass Lamp,
3226. 1 pr. Blow-pipe Tongs, with Pla-	2575. 1 Blow-pipe Knife,
tinum ends,	1690. 1 Small R. Berlin Casserole, No. 1,
3116. 1 Mixing Spoon, with Spatula,	1687. 1 Semi " " " No. 1,

APPARATUS.—*Continued.*

- | | |
|---|---|
| 2233. 1 Evolution Flask, with Delivery Tube, | 2906. 2 Plain Pipettes, |
| 3031. 1 Clark's Retort, | 1 Hare's Foot, |
| 3378. $\frac{1}{4}$ lb. assorted Glass Tubing, | 3226, 3271. 1 Test Tube Rack, fitted, |
| 2322. 1 Glass Funnel, ea. 2, $2\frac{1}{2}$ & 3 in. | 3274. 1 Wooden Test Tube Holder, |
| 1864. 2 Glass Covers, each 3 and 4 in., | 1575. 2 Test Tube Brushes, |
| 2321. 1 Nest of German Funnels, | 3267. 6 sheets Assorted Test Papers, |
| 3216. 1 Small Funnel Holder, | 1 Small Collection of Test Metals, |
| 2251. 2 Porcelain Filter Rings, | 2210. 3 Smallest size Royal Berlin Evap- |
| 2255. 1 Pack. Cut Filters, 4, 5, 6 in., | orating Dishes, 00, 0, 1, |
| 1 Wash Bottle, Berzelius's Form, | 3164. $\frac{1}{2}$ doz 6-in. Glass Stirrers, |
| | 3008. 1 Box Blow-pipe Reagents. |

The Chemical Tests, to accompany the above Apparatus, will be packed to order, according to the number of bottles required.

3518.—Apparatus, suitable to be dealt out to Students in Colleges; each set nicely packed in dovetailed boxes, with sliding covers.

Price, \$15.00

- | | |
|--|--|
| 2498. 1 Glass Spirit Lamp, 4 oz., | 2278. 1 16 oz. Flask, Round Bottom, |
| 2615. $\frac{1}{2}$ yd. Wick, in paper box, | 3406. 1 Pint Wash Bottle, |
| 3233. 1 Small Retort Stand, | 3104. 4 Glass Slides, |
| 3351. 1 Iron Wire Triangle, | 3378. $\frac{1}{2}$ lb. Glass Tubing, $\frac{3}{8}$ in bore, |
| 3066. 1 Sand Bath, | 2279. 1 Flask for Sulphur'd Hydrogen, |
| 3414. 1 Porcelain Water Bath, 6 in., | 3408. 3 Watch Glasses, 2 in., |
| 1484. 1 Jeweller's Blow-pipe, | 3164. 2 Stirring Rods, 6 " |
| 2935. 1 Small piece Blow-pipe Foil, | 3226, 3371. 1 Test Tube Rack, filled, |
| 2938. 1 Piece 6-in. " Wire, | 3267. 6 Sheets, each kind, Test Papers, |
| 1885. 1 Porcelain Crucible, each 1 and $1\frac{1}{2}$ in., | 3357. 1 ft. Rubber Tubing, $\frac{1}{4}$ in., |
| | 2318. 1 2-in. Bohemian Funnel, |
| 3321. 1 pr. Japanned Crucible Tongs, | 2317. 1 American " 3 in., |
| 3125. 1 4-in. Spatula, | 2255. 1 Pack Cut Filters, 3 " |
| 2827. 1 Porcelain Mortar, $2\frac{1}{2}$ in., | " 1 " " 5 " |
| 1418. 1 Small Set B.aker Glasses, 0 to 4, | 2237. 1 Triangular File, |
| 2221. 1 Nest Porcelain Evaporators, | 2236. 1 Round " |
| 2276. 2 4-oz. Flasks, | |

3519.—Apparatus, for performing most of the experiments described in Stockhardt's Chemistry.

Price, \$15.00

- | | |
|---|--|
| 3033. 1 4-oz. Retort, | 2322. 1 Funnel, $1\frac{1}{2}$ and 2 in., |
| 2276. 1 Flask, each 2, 4, 6 and 8 oz., | 22 5. 1 Pack Filters, each 3 and 4 in., |
| 1416. 1 Set of 4 small Beakers, | 3104. 6 Glass Slides, |
| 2281. 1 Flask, round bottom, each 4 and 6 oz., | 2634. 1 doz. Blue Litmus Paper, |
| 2498. 1 Small Spirit Lamp, | 1 Piece Pure Zinc, |
| 2615. 1 yd. Wick, | 3164. 2 Glass Stirrers, each 3 and 6 in., |
| 1483. 1 B.ack's Blow-pipe, | 2221. 1 Semi-Porcelain Evaporator, |
| 1502. 1 doz. ass'd 4-oz. Bottles, stoppered and corked, | shallow, $3\frac{1}{4}$ in., |
| 2938, 2935. 1 Small piece of Platinum Wire and Foil, | 3029. 1 Glass Oxygen Retort, 2 bulbs, 6 oz., |
| 2829. 1 Porcelain Mortar, 00, | 2233. 1 Flask, with Deliv'y Tube, 16 oz, |
| 1644. 1 Cylinder, | 1441. 1 Beehive Shelf, |
| 3422. 1 ft. Wire Gauge, | 2236. 1 Round File, with handle, |
| 3274. 1 Test Tube Holder, | 3378. $\frac{1}{4}$ lb. Assorted Glass Tubing, |
| 3226, 3371. 1 Test Tube Rack, filled, | 3353. 1 Brass Tripod, |
| 2331. 1 Funnel Tube, | 3147. 1 Iron Spoon, |
| 1885. 1 Porcelain Crucible, | 3233. 1 Retort Stand, with 2 Rings, |
| 3262. 1 4-oz. Test Glass, | 3066. 1 Small Sand Bath, 4 in., |
| | 1715. 1 Chloride of Calcium Tube, |
| | 1356. 3 Arsenic Tubes, ass'd. |

The above apparatus can be enlarged at the pleasure of the purchaser. A set of chemical substances, accompanying the above, will also be furnished, if desired, at reasonable rates.

3520.—Apparatus, for Analysis of Urine, to accompany Manual, by Dr. Austin Flint, Jr. Price, \$40.00

APPARATUS.

- | | |
|---|--|
| <i>a</i> 1 Urinometer, 6 oz., | <i>k</i> Burette, graduated in grains, |
| <i>b</i> 1 Thermometer, 1 oz., graduated in drachms, | <i>l</i> 200-Grain Measure, |
| <i>c</i> Graduated Glasses, 1 drachm, | <i>m</i> Tube, graduated in cubic inches, with vessel in which it can be inverted, |
| <i>d</i> 4 Conical Glasses, with Porcelain Covers, | <i>n</i> Rings and Clamp for Graduated Tube, |
| <i>e</i> Porcelain Evaporating Dishes and Watch Glasses, | <i>o</i> Stirring Rods and Drop Tubes, |
| <i>f</i> Test Tube Stands, with Test Tubes, | <i>p</i> Swabs and Brushes, for cleaning, |
| <i>g</i> 3 Funnels and Filtering Paper, | <i>q</i> Platinum Spoon for Calculi, |
| <i>h</i> 3 Flasks and Wire Gauze, | <i>r</i> Blow-pipe, |
| <i>i</i> Bunsen's Burner, Rubber Tubing, etc., or Alcohol Lamp, | <i>s</i> Colored Papers, gummed for recording the color of specimens. |

CHEMICALS.—*Case of Reagents containing:*

- | | |
|--|--|
| 1 Nitric Acid, | 8 Sol. of Soda, Specific Gravity, 1.12, |
| 2 Hydrochloric Acid, | 9 Liquor, Potassa, |
| 3 Acetic " " | 10 " Ammonia, |
| 4 Nitros-Nitric " " | 11 Ether, |
| 5 Nitrate of Silver, in solution, 9.58 grains in an ounce, | 12 Mercury, |
| 6 Sulphate of Copper, in ditto, 94.73 grains in an ounce, | 13 Solution of Hypochlorite Soda, |
| 7 Neutral Tartrate of Potash solut'n, 378.91 grains in an ounce, | 14 Ditto, Chloride of Sodium, sat'rat'd, |
| | 15 Test Papers, |
| | 16 German Yeast. |

EXTRA APPARATUS AND CHEMICALS.

- | | |
|---|--|
| <i>a</i> Hydrometer, of Baume's, for Liquids heavier than Water, | <i>f</i> A Balance at least delicate enough to turn with $\frac{1}{10}$ of a grain, |
| <i>b</i> 1000-gr. 500-gr. and 100-gr. Specific Gravity Bottles, | <i>g</i> Graduated Solution of Chloride of Barium, 36.6 grains, in six fluid ozs. of Water, for Quantitative Analysis for the Sulphates, |
| <i>c</i> Water Bath, | <i>h</i> 3 Separate Solutions for Quantitative Analysis for Phosphoric Acid. |
| <i>d</i> " Oven and Swedish Filters, | 2.400-grs. of Acetate of Soda, and 800-grs. of Acetate Acid, in 6 fluid ozs. of Water. |
| <i>e</i> 2 Wash Bottles and 3 Precipitating Glasses, | 3.12-grs. of Ferrocyanide of Potassium, dissolved in 6 fluid ozs. of Water. |
| 1 Sesqui Chloride of Iron; 9.33 grs. of Iron by Hydrogen dissolved in Hydrochloric with a little Nitric Acid, evaporated to dryness and dissolved in 6 fluid ozs. of Water, | |

3521.—Apparatus, for Assay.

1369. Assay Balance, No. 1.....	\$50.00
1370. Ditto, ditto, No. 2.....	72.00
1371. Ditto, ditto, No. 3.....	72.00
1372. Ditto, ditto, ditto, with Apparatus for Rider.....	78.00
3417 to 3433. Weights, various prices.	
3522. Basin for Washing Gold.....	1.50
1462. Assay Bellows.....	.75 to 1.00
1486 to 1490. Assay Blow-pipes.....	\$2.00 to 4.00
1581. Assay Brushes, for cleaning Button.....	.50
1712. Ditto, Chisels, for clipping Ingots.....	.50
1876. Ditto, Crucibles.....	Per doz. 1.00
1877. Ditto, ditto, Iron.....	" 2.50
1878. Ditto, ditto, French, Beaufay.....	.05 to .08
1879. Ditto, ditto, Covers.....	.50 to .75
1870. Ditto, Glass Covers.....	.50 to .75

APPARATUS.—*Continued.*

1882. Assay Crucibles, Plumbago.....	\$.20 to 1 63
1893. Ditto, ditto, Platinum.....	Per gramme. .40 to .45
1895. Ditto, ditto, Metallurgists.....	.20
1896 to 1907. Ditto, ditto, Sand.....	.05 to .35
1908. Ditto, ditto, Roasting.....	.75
1911. Ditto, ditto, Supports.....	.60
1919. Bone Ash Cupels.....	Per doz. .35 to 2.25
1940. Cupel Holders.....	1.00
1921. Ditto, Moulds.....	2.50 to 4.50
2007. Iron Dippers.....	.40 to .50
2008. Tin Dippers.....	.60 to .80
2016. Roasting Dishes.....	Per doz. .75 to 5.00
2217. Evaporating Dishes.....	Per set. 2.75
2219. Ditto, ditto.....	" 2.50
2236, '37. Files.....	.18 to .50
2273. Parting Flasks.....	Per doz. 1.50
2274, 2275. Assay Flasks.....	.50
2296. Forceps, for crushing the Button.....	1.75
2358. Furnaces, Kent's.....	21.00
2360. Ditto, Cupelling.....	15 to 35.00
2361. Ditto, Hibb's Patent.....	50.00
2365. Ditto, Griffin's Gas.....	20.00
2368. Ditto, Chilton's.....	40.00
2448. Hammers.....	1.00
2451. Ditto.....	1.75
2453. Ditto.....	2.50
2838. Ingot Moulds.....	1.50 to 2.50
2822. Iron Mortars.....	.40 to 4.75
2532. Ivory Scale, Harcourt's.....	5.00
2621. Lenses or Glasses, Magnifying.....	2.50
2623. Ditto, ditto, Stanhope's.....	2.00 to 2.50
2688. Mineralogists' Slates, for trying the Streak of Minerals.....	.40 to .50
2841 to 2847. Muffles.....	.30 to 2.50
3008, 3009. Reagent Cases.....	2.50 to 4.00
3087. Scoops, for Assay.....	1.50
3085. Scorifier Holders.....	1.50
2836. Ditto, Moulds.....	5.00 to 7.00
3086. Scorifying Moulds.....	1.00
3180. Stop-cocks of Silver, for Assay.....	30.00
2297. Tongs, for holding hot Tubes.....	1.00
3319 to 3320. Ditto, Coal.....	1.00 to 1.75
3321 to 3328. Ditto, Crucible.....	.50 to 6.50
3333 to 3336. Ditto, Cupelle.....	1.50 to 2.75
3337. Ditto, Scorifier.....	1.25

Apparatus for General Use in Analysis: Spirit Lamps, Furnaces, Flasks, Beakers, Test Glasses, Baths, Filtering Apparatus, Evaporating Basins, Retorts and Receivers, Hydrometers, Stills, Gas Bottles, and other Analytical Apparatus, will be found under their respective heads in this work.

3523.—Apparatus, for Assay before the Blow-pipe.

Lingke's Freiburg complete set of Blow-pipe Apparatus, for Qualitative and Quantitative Analysis, in German silver, comprising every article used in blow-piping, with reagents of the most choice kind, put up in extra fine, close-stoppered bottles, each bottle covered with an extra rubber cap to preserve their purity, with accurate Specific Gravity Balance, enclosed in a glass and mahogany case, and each department packed in highly polished mahogany cases, and the apparatus and reagents again enclosed in an elegant mahogany case, with lock and key, and the whole apparatus and scales enveloped in leather envelope straps and handles, for hand transportation. \$275.00

3524.—Apparatus, the same as the foregoing, in Brass. \$260.00

3525.—Ditto, Lingke's, for Gold and Silver Assay. 200.00

The above are all manufactured to order, by Dr. Lingke, and have his stamp on, and are well known to be the most complete apparatus of the kind to be found anywhere. The Balances are very celebrated for their delicateness and accuracy.

1370, 1372. Balances.....	\$72.00 to \$78.00
1482 to 1497. Blow-pipes, various.....	50 to 12.00
2932. Ditto, Tips, Brass and Platinum.....	.10 to 1.50
2568. Ditto, Jets.....	.25
1344 to 1346. Ditto, Anvils.....	.75 to 1.00
1581. Button Brush.....	.50
1694. Carbon Cells, for fusions.....	.50
1672. Blow-pipe Capsules.....	Per doz. 1.25
1673. Ditto, ditto.....	Each. .20
1674. Ditto, ditto.....	Per doz. 1.20
1675. Ditto, ditto.....	" 1.75
1701. Charcoal, 4 pieces for.....	.25
1702. Charcoal Borers, Spatula Handles.....	.30 to .40
1703. Ditto, ditto, 4 points, Cocoa Handles.....	.50 to .75
1704. Ditto, ditto, 8 points, ".....	1.00 to 1.25
1705. Charcoal Holders.....	2.75
1706, 1707. Ditto, Saws.....	.50 to .75
1708. Ditto, Spatulas.....	.50
1711. Ditto, Sticks.....	.50 to .60
1709, 1710. Ditto, Tongs.....	.75 to 1.25
1712. Chisels for clipping Ingots.....	.50
3526. Clay Cylinder.....	.25
1800. Compasses.....	2.50
1806. Ditto.....	15.00
1870. Covers of Glass for covering Choice Specimens.....	.50 to .75
3527. Crucibles, Iron, with Cover.	
1919. Cupels, Bone Ash.....	Per doz. .35 to 3.25
Bone Ash, for Cupels, according to quality. See Chemicals..	.30 to .70
1920. Cupel Holders.....	1.00
2941. Cutting Pliers.....	1.25
2282. Blow-pipe Flasks.....	Per doz. .60
2291 to 2312. Ditto, Forceps.....	.25 to 2.50
3528. Funnel Holders, Plattner's.....	.25
1346. Hammers, French, with two ends, one flat for crushing, and one round end for pulverizing, with round anvil, having one side flat for crushing, and the other side with concave center for pulverizing, and provided with a brass circular cap to retain the powder in the mortar, finely finished, with German silver tip to the handle.....	10.00
2446. Ditto, Plattner's.....	.75
2447. Ditto, Freiburg.....	1.00
2448, '49. Hammers.....	1.00 to 1.25
2451 to 2453. Ditto, heavier.....	1.75 to 2.50
3529. Hare's Foot.....	.10
2457. Holders for Platinum, Spoons and Wire.....	.60
2575. Knives, Plattner's.....	.75
2 76. Ditto, for Glass Tubing.....	.50
2604. Lamp, Plattner's.....	3.00
2596 to 2601. Spirit Lamps.....	.50 to 1.00
2659. Lead Measures.....	.50
2621 to 2623. Lenses.....	1.00 to 3.50
2646. Magnets, Bar.....	1.00
2688. Mineralogist's Slates, for trying the Streak of Minerals.....	.40 to .50
2690. Mixers, or Mixing Capsules, brass.....	.50 to 1.00
2691. Ditto, ditto, ditto, horn.....	.25

APPARATUS.—*Continued.*

2818. Mortars, Agate.....	\$1.90 to 30.00
1998, '99. Ditto, Diamond, of steel.....	5.00 to 7 50
2822. Ditto, Iron.....	.40 to 4.75
2831. Ditto, Steel, highly polished.....	2.00 to 5.00
2832. Moulds, Boxwood, for Cartridge Cases.....	.20
1909. Ditto, ditto, for Charcoal Basins.....	.75
1910. Ditto, Brass, for Clay Crucibles.....	4.25
1921. Ditto, ditto, for making Cupels.....	2.50 to 4.50
2836. Ditto, ditto, ditto, Scorifier.....	5.00 to 7.00
2838. Ditto, Iron, for Gold and Silver Bars.....	1.50 to 2.50
1922. Ditto, Steel, for Cupels, with Supports.....	2.75
2837. Ditto, Wood, for forming Charcoal pieces, oblong.....	1.25
3530. Ditto, ditto, ditto, ditto, blocks, square.....	
2813. Mouth-Pieces of Horn.....	.25
2814. Ditto, ditto, Ivory.....	.50
1580. Pencils, Camels' Hair, for taking up fine dust from the Balance Pan, etc.....	.25
Platinum Foil and Wire.....	Per grain. .02½
3008. Reagent Cases, with turned Caps, small.....	2.50
3009. Ditto, ditto, with space for Blow-pipe, Forceps and Platinum Box.....	4.00
3111, '12. Reagent Chests.....	10.00 to 12.00
3046. Roasts, Plattner's.....	2.00
2658. Scales, Harcourt's, for Measuring the Button.....	5.00
3080. Scissors.....	.50 to 1.00
3099. Sieves, Box, Griffin's.....	2.50
3100. Ditto, Plattner's, Brass.....	.50
3117. Spatulas, Horn.....	.10 to .40
3124. Ditto, Steel, small.....	.40
3154, '55. Spoons, Horn.....	.15 to .50
3147. Ditto, Iron, small and large.....	
3113. Ditto, Ivory, Plattner's, small and large.....	
2928. Ditto, Platinum.....	
3267. Test Papers.....	Per sheet. .05
3117. Tin Foil.....	Per square ft. .15
3349. Triangles, Plattner's.....	.25
1357. Tubes, Bulbs, for subliming.....	Per doz. .75
3417 to 3433. Weights, various prices.....	
3455. Wire, Copper.....	Per lb. 2.00

Files, Flasks, Funnels, and other Apparatus. See appropriate apparatus under their respective heads.

3531.—Set of Instruments, for Blow-pipe Analysis. \$45.00

1 Brass Blow-pipe, with 2 Platinum Tips,	1 Bar Magnet.
1 Ditto, Blow-pipe Lamp,	1 Magnifying Glass, with 2 Lenses,
1 Stand for Evaporating Dish, Triangles, etc.,	1 Alcohol Lamp, with Brass Cover,
1 Funnel Holder and Chimney,	2 Ivory Spoons,
1 Platinum Pointed Forceps,	1 Charcoal Saw,
1 Brass Forceps,	1 Mattress Holder,
1 Steel Forceps, for Lamp,	1 Knife,
1 Pair Cutting Nippers,	1 Assay Button Brush,
1 " Flat Forceps,	2 Mixing Capsules, 1 brass, 1 horn,
1 Platinum Wire Holder, with 6 Wires,	1 Steel Mixing Spatula,
1 Hammer,	2 Brushes,
1 Anvil,	1 Box for Soda Papers,
1 Steel Mortar,	1 Wooden Form for Paper Cylinders,
1 Agate ditto, 2½ in. in diameter,	1 yd. Lamp Wick,
1 Charcoal Borer, club-shaped,	1 Cupel Holder, with 2 Cupel Cups and 1 Mould,
1 " " four-cornered,	1 Charcoal Holder, with Platinum Ring and Screw,
1 " " with Spatula,	1 Test Lead Measure,

APPARATUS.—*Continued.*

- | | |
|--|--|
| 1 Box for Clay Crucibles,
1 pair Lamp Scissors,
1 Wash Bottle,
1 Dropping Bottle,
3 Porcelain Dishes, 3 sizes,
2 " Cups, for Gold Assay,
2 Watch Glasses,
6 Wooden Boxes, for Reagents, | 12 Bottles with Glass Stoppers, flat,
1 Charcoal Holder Stand,
1 Coal Tray,
1 Dirt "
1 Clay Cylinder,
2 Iron Rings,
1 Hare's Foot. |
|--|--|

3532.—Set of Apparatus, for Quantitative Blow-pipe Use.

\$15.00

- | | |
|---|---|
| 1 pair Flat Pincers,
1 Assay Button Brush,
2 Mixing Capsules, 1 Brass, 1 Horn,
1 Cupel Stand, with 2 Cupel Cups and
1 Mould,
1 Charcoal Borer, club-shaped,
1 " " four-cornered,
1 " " with Spatula,
2 Brushes, 1 large, 1 small,
1 Box for Soda Papers,
1 Wooden Form for Paper Cylinders,
1 Test Lead Measure, | 1 Charcoal Holder, with Platinum
Ring and Screw,
2 Ivory Spoons,
2 Porcelain Cups, for Gold Assay,
1 Box for Clay Crucibles,
1 yd. Lamp Wick,
1 Steel Mortar,
1 Knife,
1 pair Lamp Scissors,
1 Wash Bottle,
12 Glass Bottles, with Flat Stoppers. |
|---|---|

3533.—Apparatus, for illustrating Hinrich's Elements of Physics.

For exclusive use in the Lectures (see School Laboratory, 1871, p. 66), the teacher should procure as much as possible of the larger apparatus and finer specimens of crystals, minerals, etc., mentioned in the work. No general directions can here be given; the wants and means of the school will have to be consulted in making out the order. The teacher ought, however, always to give the precedence to the apparatus to be used by the students in the Laboratory Practice, if the means of the school do not permit the purchase of this necessary apparatus and the more costly apparatus also. This simple apparatus required for the demonstration of the Fundamental Laws of Electricity (see 341 to 372), is more important to the student, and therefore to the school, than the more expensive and more powerful machines (373 to 380); that is, the simple apparatus for students' experiments must be obtained first; the fine electrical machines and batteries should thereafter be procured as soon as possible. The necessary apparatus for Student's Laboratory Practice is divided into two distinct groups, viz.: I. Apparatus placed at convenient points in the Laboratory, to be used by students in general; II. Sets of Apparatus, put up in a separate tray, of wood or pasteboard, sufficient to demonstrate any given article in the book. (See article 492 in the Elements of Physics.)

Every piece of apparatus should be labeled. (See El. Phys., 495-'96.) Below, the principal fixed apparatus for general use is enumerated. A few sets for the demonstration of separate articles have been added, simply to serve as examples. A full enumeration of all the sets required would demand too much space.

I.—APPARATUS FOR GENERAL USE.

- | | |
|--|--|
| 7. Meter Rods, of wood or brass, several, labeled No. 1, No. 2, etc.
Decimeter Rules, of card paper or brass; a great number; to be distributed with the sets (see II); also called Centimeter Scale
Meter Tape, 10 meters long. | 11. Graduated Cylinders, several, viz:
100 c.c. divided to 1.0 c.c.
50 " " 0.5 "
10 " " 0.1 "
Of the last a considerable number is required for the several sets II. |
|--|--|
10. A Twenty-five Cubic Centimeter Flask.
 A 100 ditto.
- 15-21. Balances and Weights:
 a Druggists' Counter Scales—set, of Weights 0.1 gr. to 1000 grms., mainly for work in Chapter II.

APPARATUS FOR HINRICH'S PHYSICS.—*Continued.*

- b** Druggists' Prescription Scales—set of Weights 0.1 to 50 grms.
c Ditto, with Weights 0.01 to 50 grms.; with Equipoise for one scale-pan, for use as Hydrostatic Balance. See 123.
 (Larger Laboratories require several of each of these three balances.)
35. Protractors, brass, horn; a considerable number, both for sets in § vi, Chap. III, and § iv Chap. I.
36. Goniometers; a considerable number, for sets in § vi, Chap. III.
37. A Good Pendulum Clock.
38. A Simple Second Pendulum; metallic bob and double iron wire. (School Lab., 1871, plate 3, fig. 6, upper pendulum.)
131. Barometer Scale, English inches, to 0.01 inch. Convert to mm., by Table, p. 167.
136. Aspirator.
148. Mortars, of Porcelain and Agate.
259. Astronomical Telescopes, Achromatic.
a Common, power 5 to 10.
b* Larger, mounted (best equatorially), power 16 to 64; objective 6 to 10 cm. diameter.
277. Opera Glass.
281. Microscopes.
a Common, imported, cost about \$20.00.
b* Large, bulbs, more powerful.
286. Micrometer, on glass, 1 mm., in 50 parts.
- 288*. Microscope, with Polarizing Apparatus, for observation of microscopic crystals (290).
301. Horse-shoe Magnet, strong, with Keeper.
323. Lodestone, in box, with iron filings and nails.
327. Compass.

II.—SEPARATE SETS.

Each set, as far as possible, put up in a separate tray; all pieces labeled. (See article 495).

12. Volume of One Drop of Water—1. Tube Pipette; 2. Graduated Cylinder, 10 c.c. to 0.1; 3. Bottle for Distilled Water.
13. Test Graduated Cylinder—1. Graduated Cylinder, 10 c.c. to 0.1; 2. A One-cubic Centimeter Pipette; 3. Bottle for Water.
14. Mensuration of Volume of Vessels—1. Graduated Cylinder, 50 c.c. to 0.5; 2-3. Two Test Tubes; 4. Beaker; 5. Flask; 6. Porcelain Dish; 7. Centimeter Scale.
24. Determine Weight of U. S. Coins—1. Half Dollar; 2. Quarter Dollar; 3. Dime; 4. Five Cents, Nickel; 5. One Cent, Copper.
 As 24b, c, etc., similar Lots of Foreign Coin may be put up separately.
28. Specific Gravity of Rectangular Solids—1. Tablet of Wood; 2. Prism of Wood; 3. Rectangular Block of Cork; 4. Rectangular Piece of Lead; 5. Sandstone; 6. Limestone; 7. Centimeter Scale.
29. Specific Gravity of Liquids—1. Graduated Cylinder, 10 c.c. to 0.1; Bottles contain'g: 2. Water; 3. Alcohol; 4. Gasolene.
- 30a. Specific Gravity of Solids Insoluble in Water—1. Graduated Cylinder; 2. Bottle with Water; Specimen Tubes with Fragments of, 3. Galenite; 4. Gypsum; 5. Iron (nails); 6. Lead (shot); 7. Sulphur; 8. Anthracite.
306. Specific Gravity of Solids Soluble in Water—1. Graduated Cylinder; 2. Bottle with Gasolene; Specimen Tubes with: 3. Crystals of Nitre; 4. Crystals of Blue Vitriol; 5. Crystals of Alum.

3534.—Set of Apparatus, Quantitative, to be dealt out to each Student, as recommended by the School of Mines, Columbia College, New York City. \$47.50

- 2 Bunsen's Burners,
 2 Rubber Tubes for ditto, 2 ft. each,
 2 Iron Ring Stands,
 4 Filter Stands,
 1 Test Tube Rack,
 12 Test Tubes, 4 in.,
 12 " 6 "

- 2 Test Tubes, 7 in.,
 1 " 8 "
 1 Nest of 6 Beakers, plain,
 3 " " lipped.
 3 Funnels, 1½ in.,
 5 " 2½ "
 2 " 3¼ "

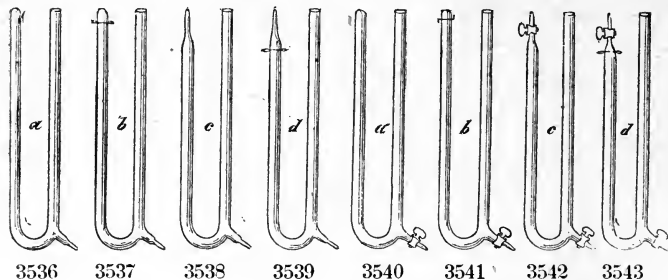
STUDENTS' QUANTITATIVE APPARATUS.—*Continued.*

1 Funnel, 4 in.,	1 File,
1 " 5 "	2 Steel Forceps,
1 Wash Bottle, pint,	1 oz. Bichloride of Platinum, Solution,
1 " 8 oz.,	6 " Nitrate of Silver,
1 " 4 oz.,	2 Bottles for ditto,
3 Convex Covers, 3 in.,	2 " corked, 10 oz.,
3 " 4 "	2 " " 8 "
3 " 5 "	2 " " 4 "
3 Ground Glass Covers, 3 in.,	2 " " 1 "
3 " " " 1 "	2 Sand Baths,
3 " " " 5 "	4 Wire Triangles,
6 Watch Glasses,	2 Towels,
2 Chloride of Calcium Tubes,	1 Scissors,
1 Flask, 1 oz., for Carbonic Acid,	1 Test Tube Brush,
1 doz. Specimen Tubes, 3 in.,	1 Horn Spatula, 4 in.,
2 Dessicators,	1 Package Cut Filters, 3 in.,
2 Glass Tubes,	1 " " 4 "
2 Glass Rods,	6 Sheets Swedish Paper,
3 Porcelain Crucibles, 1½ in.,	1 " Glazed "
2 " " 1¾ "	1 Set Filter Patterns.
1 Nest of 6 Evaporating Dishes,	1 ft Rubber Tubing, ¾ in.,
2 Casseroles, 4 in.,	2 Pieces Wire Gauze,
1 Porcelain Mortar, 4½ in.,	1 Copper Water Bath,
1 Blow-pipe,	1 Rat-Tail File,
2 ft. Platinum Wire,	1 Watch Glass Clip.
2 Platinum Foils,	

3535.—Set of Apparatus, Qualitative, to be dealt out to each Student as recommended by the School of Mines, Columbia College, New York. \$24.00

1 Bunsen's Burner,	1 Blow-pipe,
1 Rubber Tube for ditto, 2 feet,	1 Foot Platinum Wire,
1 Iron Ring Stand,	1 Platinum Foil,
2 Filter Stands,	1 File,
2 Test Tube Racks,	1 Steel Forceps,
24 Test Tubes, 4 in.,	1 oz. Bichloride of Platinum, Solut'n,
2 " 6 "	6 " Nitrate of Silver, "
2 " 7 "	2 Bottles for ditto.
1 " 8 "	2 " corked, 1 oz.,
1 Nest of 6 Beakers, plain,	2 Sand Baths,
2 Funnels, 1½ in.,	2 Wire Triangles,
2 " 2¾ "	1 Towel,
1 Wash Bottle, pint,	1 Scissors,
6 Watch Glasses,	1 Test Tube Brush,
1 Flask, 4 oz.,	1 Horn Spatula, 4 in.,
2 Glass Tubes,	2 Packages Cut Filters, 3 in.,
1 Glass Rod,	2 " " 4 "
2 Porcelain Crucibles, 1½ in.,	1 Foot Rubber Tubing, ¾ in.,
2 " " 1¾ "	1 Piece Wire Gauze,
1 Nest of 6 Evaporating Dishes,	1 Deflagrating Cup,
1 Porcelain Mortar, 4½ in.,	1 Blue Glass.

HOFFMAN'S APPARATUS.



Apparatus which may be Used to Illustrate Hoffman's Modern Chemistry. Most of these Forms are constantly on hand, and all the Joints are carefully sealed and Stop-cocks ground in the most careful manner.

3536. *Hoffman's Glass U Tubes*, 16 inches (a), with plain bent Tube sealed in below\$1.00

3537. Ditto, ditto, ditto, ditto, 16 inches (b), with Platinum Electrodes sealed into the top of one of the Tubes.....\$1.25

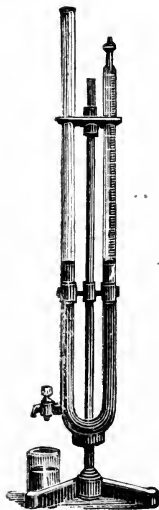
3538. Ditto, ditto, ditto, ditto, 16 inches (c), with plain bent and inlet-tubes\$1.00

3539. Ditto, ditto, ditto, ditto, 16 inches (d), with Platinum Electrodes sealed into the top of one of the Limbs.\$1.50

3540. Ditto, ditto, ditto, ditto, 16 inches (a), with delivery-cock at the base of one of the Tubes\$2.00

3541. Ditto, ditto, ditto, ditto, 16 inches (b), with delivery-cock at the base of one of the Tubes, and Platinum Electrodes sealed into one of the Limbs.....\$2.50

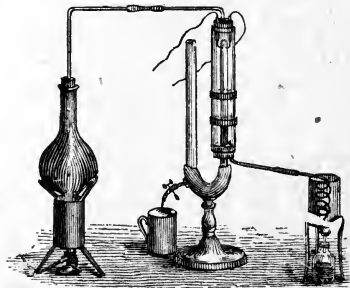
3542. Ditto, ditto, ditto, ditto, 16 inches (c), with glass outlet-cock and waste-cock at the top of one of the Limbs\$3.00



3544



3546



3549

3543. Ditto, ditto, ditto, ditto, 16 inches (d), with glass outlet-cock and waste-cock at the top of one of the Limbs, and Platinum Electrodes sealed into one of the Limbs\$4.00

3544. *Hoffman's Lecture Endiometer*, mounted on stand, complete\$15.00

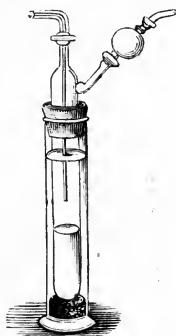
HOFFMAN'S APPARATUS.—Continued.

3545. Hoffman's Apparatus, for Recomposition of Water, consisting of three Eudiometers, mounted on stand, each provided with a Delivery Cock of glass, and two of them with cocks in the top..... \$15 00

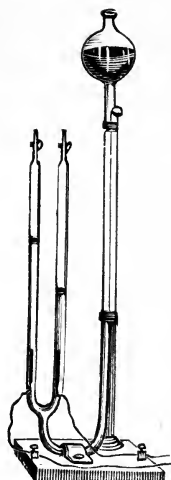
3546. Ditto, ditto, for the Decomposition of Hydrochloric Acid in Hydrogen and Chlorine: of Water into Hydrogen and Oxygen, and of Ammonia into Hydrogen and



3550



3554



3556

Nitrogen, consisting of a V-shaped Tube, with Platinum Electrodes, mounted on stand..... \$6.00

3547. Ditto, ditto, ditto, ditto, unmounted..... 2.50

3548. Ditto, ditto, for the Illustration that the Gas evolved from Hydrochloric Acid by the Electric Current contains equal volumes of Chlorine and Hydrogen, unmounted..... \$3.00

3549. Apparatus, for Demonstration of Oxygen, Hydrogen and Water, consisting of U Tube, mounted on stand, supplied with Stop-cock Delivery Cock and Glass Worm, complete..... \$15.00

3550. Ditto, for ascertaining the exact proportions of Hydrogen and Nitrogen in Ammonia, unmounted..... \$3.00

3551. Metallic Supports for the above, and other similar apparatus, each..... \$4.00

3552. Hoffman's Apparatus, for the Demonstration of Proportion, at equal volumes of Water, Hydrochloric Acid and Ammonia, consisting of U Tube with Stop-cocks at top, Pinch-cock at bottom, with Platina Electrodes, mounted on stand, No. 913..... \$10.00

3553. Ditto, ditto, for the Determination of Chlorine Water, consisting of U Tube, with fine ground glass Stopper at the top, and having also Platinum Electrodes on arm, No. 259, mounted..... \$7.00

3554. Ditto, ditto, for the Testing of Sulphuric Acid, consisting of a long glass vessel or bottle, into the neck of which is ground stoppered with fine emery, a Glass Tube running about half way down the bottle, and bent at right angles at the top. Out of the shoulder of this bottle projects a Tube, having two fine ground glass Stop-cocks, with a bulb between them; the whole is firmly fixed by a cork into a strong cylindrical glass receptacle, having a flat bottom..... \$7.50

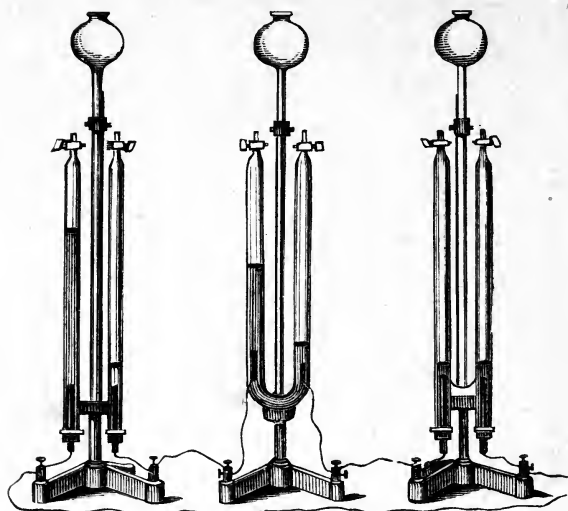
3555. Ditto, ditto, Four Burners, mounted on one stand, each Burner about 2 inches apart..... \$7.50

1755. Hoffman's Watch Glass Clamps, each..... 20

3556. Hoffman's Apparatus, for the Decomposition of Water, consisting of three Way Tubes, with two glass Stop-cocks for delivery and one large bulb in the Supply Tube, with Platinum Electrodes sealed in and communicating with the strips of Platinum Foil, unmounted..... \$6 50

3557. Ditto, ditto, ditto, mounted..... \$10.00

3558. Ditto, ditto, with Charcoal Points for the Electrolysis of Hydrochloric Acid and Ammonia, mounted..... \$15.00

HOFFMAN'S APPARATUS.—*Continued.*

3559

3559. Apparatus, for Volumetric Electrolysis of Carbonic Acid Gas, Water and Ammonia, through one Electric current, consisting of two Three Way Tubes with two glass Stop-cocks with Carbon Electrodes and one Three Way Water Decomposing Apparatus, each separately mounted, with special Binding Screws. All the above having large glass Bulbs..... \$30.00

3560. Ditto, ditto, for the Arrangement of Combustion Experiments, consisting of a large glass Tube drawn at the upper end and bent at right angles, into which is secured a glass Stop-cock, connecting with a rubber Tube delivery into the lower or open end is fitted, by means of a rubber stopper, a tube of medium width, into which is secured a glass Stop-cock tube with a burner of Platinum Foil in the end. There is also a blowing tube, bent at right angles, fitted into the same rubber stopper..... \$10.00

3561. Hoffman's Apparatus, for showing the principle of Carré's Ice Freezer, by producing ice from water by the employment of Ammonia. \$15.00

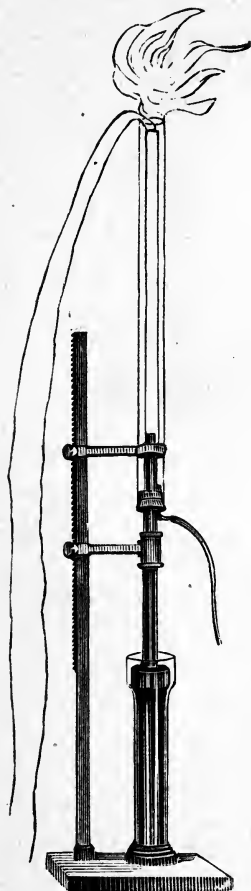
3562. Ditto ditto, for the condensation of the Elementary Gases, Hydrogen and Oxygen, in water, at boiling temperature, as well as for Eudiometric Analysis of the Fire Damp and the oil forming gases (as per Hoffman's Modern Chemistry, Fourth Edition; also per Records of the German Chemical Society, 2d Vol., p. 245), consisting of an Iron Stand with Toothed Bar, in which is secured a long glass tube, supplied with Platinum Electrodes, and fastened in a brass support, which can be easily moved up and down..... \$30.00

3563. Ditto, ditto, for burning Sulphur by the Electric Current, demonstrating equal volumes of Oxygen and Carbonic Acid Gas, also Sulphurous Acid formed from it; consisting of an U shaped tube, with a large bulb near the top, which is stoppered with a two-holed cork, and provided with a Waste-cock. In each hole in the cork is a wire fastened, one of which is provided with a small spoon to receive Carbon, or Sulphur. The upper ends of the wire are supplied with Binding Screws. (See illustration, p. 236.)..... \$12.50

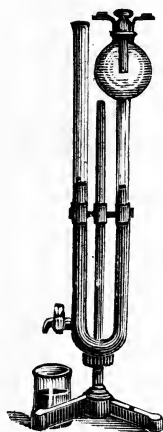
3564. Ditto, ditto, to observe the ratio of volume of Simple and Compound Gases under the influence of pressure and changes in the temperature (Per Hoffman's introduction to his work on Modern Chemistry, and Records of the German Chemical Society, 2d Vol., p. 257), consisting of a long U formed glass tube, ending in four vertical branch tubes in the shape of a fork and supplied with glass cocks. The apparatus is carefully held in place by a nicely constructed support, which sustains four glass cylinders, fastened in

HOFFMAN'S APPARATUS.—*Continued.*

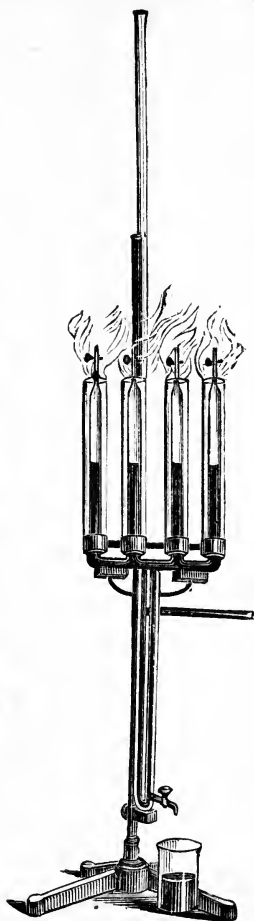
place with metal spring caps, which envelope each branch tube. These caps are so arranged that they may be connected with a Steam-boiler by means of a metal pipe.....\$50.00



3562



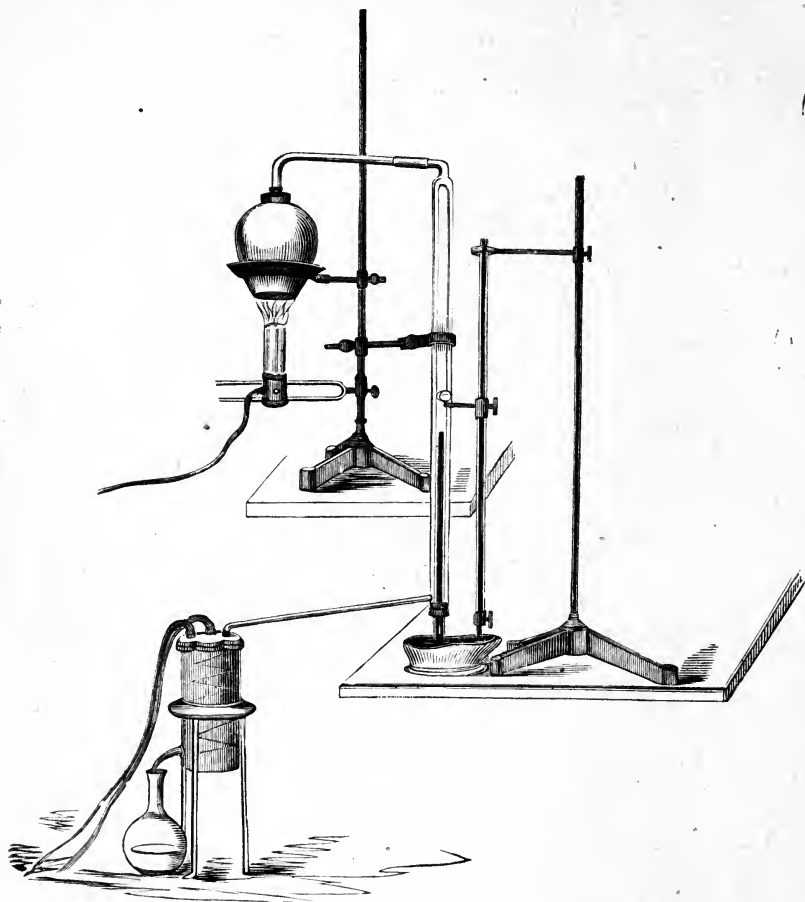
3563



3564

3565. Hoffman's Steam-Tight Determination Apparatus, consisting of a Barometer Tube, 1 Meter long, graduated in $\frac{1}{2}$ Centimeters, and secured with a middle sized cork into a middling wide encasing tube. The latter is drawn small at the top, in a right angle, which terminates in a boiling vessel, supported on an iron stand, over a lamp flame of 3 tubes. Out of the lower end of the encasing tube runs a tube connecting with a condensing tub. The graduated tube descends into a Mercury trough, out of which also runs a measuring tube, graduated by a "Nonius" graduating screw, showing the volume by the pressure of the quicksilver.

3566. Murrel's Distilling Apparatus. (*See Ill., p. 237.*) For either Chemical Laboratories, Polytechnic Schools or Provisional Assay offices. Com-

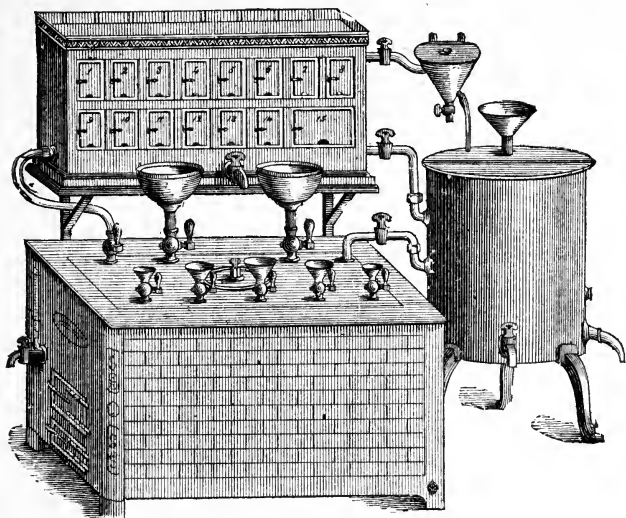
Hoffman's Steam-Tight Determination Apparatus.

3565

MURLE'S DISTILLING APPARATUS.—Continued.

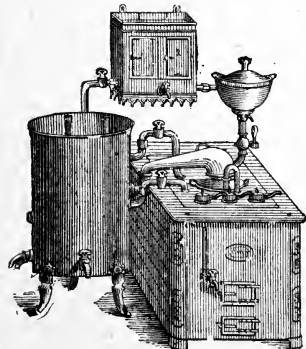
plete, ready to set into brick. The condensation of steam takes place in the cooling tub, generally; a large Sand Bath accompanies the apparatus, which can be heated at the same time and with the same fire in the hearth, in which case the cooling tub must be placed elsewhere. The length of this apparatus is $6\frac{1}{2}$ feet, depth 3 feet. The separate parts of this apparatus are: 1 Copper Steam-boiler, tinned inside; 1 Cooling Tub with cover and level tubes; 1 Filling Funnel; 2 large Caps with ball Stop-cocks; 5 small ditto; 1 Tin Alimentary Feeding Tube; Glass Water Gauge; Copper tinned Steam Drying Box, with 15 compartments; 1 Steam-pipe, running from the Steam-boiler to the Drying Box; 1 ditto, to the Cooling Tub from the Drying Box; 1 Winding Tube; Detaining Pins; Filtering Funnel, with Binding Tubes; 3 Intermediary Stop-cocks on the Steam-pipe; 3 Dogshead Stop-cocks for the Steam-boiler; Drying Case; Cooling Tub; Steam-boiler Plate (2 entire); Pedestal for the Cooler; Board for the Drying Case; 2 Props for ditto; Fish-bellied Roast, etc., etc.

MÜRRLE'S DISTILLING APPARATUS. imported only to order. (*For description, see pp. 235, '36.*)

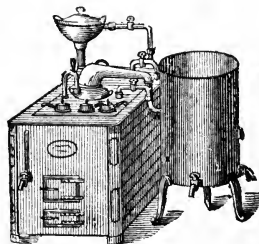


3566

3567. Distilling Apparatus, with Adjuncts, according to Dr. Mohr, consisting of: 1 Distilling Alembic of 2 gals.; Water Jacket, Steam-pipe, Neck; Angular Condensing Tubes; Steam-pipe, with Transverse Stop-cock; Condenser for distilling water; large and small Detaining Pins; Alimentary Feeding Pipes; 2 Apparatus Boxes of 24 oz.; 1 ditto, of 12 oz.; 1 ditto, of Emilian shape, of 24 oz.; 2 Faucets; Steam-pipe, with Intermediary Stop-cocks from the Cap into the Steam-pipe which conducts the distilled water into the Cooler; Casseroles, with cover, $3\frac{1}{2}$ qts.; ditto, of Emilian, of 2 qts.; 2 Intermediary Stop-cocks; 2 Dogshead Stop-cocks on the Steam-boiler and



3567



3568

Cooling Tube; 1 little Stop-cock on the Cap; Brass Connectors, hermetically sealed on the Apparatus, Tubes and Faucets; Copper Steam-boiler of 30 qts.; Cooling Tub of 125 qts.; 2 level Tubes with Funnel; Glass Water Gauge; Cap of one of the Evaporating Dishes; Front Plate; Covering Plate; Side Frame; Hot-air Passage; Fish-bellied Roast; Iron Steam-boiler Plate; Little Ring Plates on the Cap; Wooden Pedestal; Knob, Feet and Binding of the Crank Hands; Brush, Plaster Model, etc.

3568. Distilling Apparatus, Dr. Mohr's, together with 1 Dry Box, 1 2-gal. Still, Water Jacket, Steam Tube, Neck, Angular-shaped Worm, Steam Tube, with Intermediary Stop-cock; Worm for distilling water; Alimentary Feeding Pipe; 2 Apparatus Boxes, *a*, 24 oz.; 1 ditto, of 12 oz.; 1 ditto, Emilian, of 24 oz.; 2 Faucets; Steam Pipes, with Intermediary Stop-cock, running from Steam-boiler to the Cooling Tub and Drying Box; little Stop-cock on Cap; Brass Connectors, hermetically sealed; Steam-boiler, of copper, of 30 qts.; Cooling Tub of 125 qts.; 2 Level Tubes, with Funnel; Glass Water Gauge; Cap of one of the Casseroles; Steam Drying Box, with two compartments with two perforated shelves; Front Plate; Covering Plate; Side Frame; Hot-air Passage; Fish-bellied Roast; Iron Steam-boiler Plate; Wooden Pedestal; Little Ring Plates on the Caps; Knob, Feet and Binding of the Crank Handle; Brush, Plaster Models, etc.

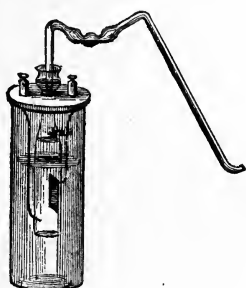
3569 is of a construction similar to 3568, only with *smaller dimensions*, its depth being a space of 2 ft. 4 in., and, in its front, inclusive of a space under the Cooling Tub (to place Flasks) is 4 ft. 5 in., and it consists of 1 Distilling Alembic, with Cover, of 6 qts.; Water Jacket; Steam Pipe, with Intermediary Stop-cock; Cooling Tubes for distilling water; 2 Detaining Pins; Alimentary Feeding Pipe; 2 Apparatus Boxes of 12 oz.; 1 ditto of 6 oz.; 2 Faucets; Steam Pipe, with Intermediary Stop-cock, from the Cap into the Steam Pipe which conducts the distilled water into the Cover; Casseroles, with Cover, of 1½ qts.; 2 Intermediary Stop-cocks; 2 Doghead Stop-cocks on Steam-boiler and Cooling Tub; little Stop-cock on Cap; Brass Conductors, hermetically sealed; Copper Steam-boiler of 18 qts.; Cooling Tub of 60 qts.; 2 Level Tubes, with Funnel; Glass Water Gauge; Cap of one of the Casseroles; Front Plate; Cooling Plate; Fish-bellied Roast; Steam-boiler Plate; Pedestal on the Tub, with Stationary Screw; Knob, Feet and Binding of the Crank Handles; Brush, Plaster Model, etc.

In addition to the foregoing illustrated styles, I have facilities for importing others similar in character.

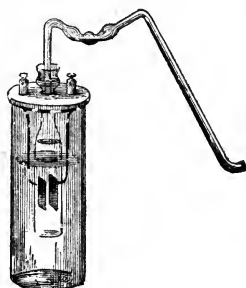
3571.—BUNSEN'S APPARATUS, for GAS ANALYSIS.

1248a. Absorptiometer, for Measuring the Absorption Power of Gases.....	\$50.00
2410. Gasometer, Bunsen's, Mercurial Graduated Millimeters.....	2 75
2888. Gas Photometer, Bunsen's, 5 feet long, carefully registered scale with sliding and reflecting screen, complete, as used in the University of Heidelberg, with gauge.....	\$30.00
2411. Gas Meter, with Exposed Indices, showing tens, hundreds, and thousands Pressure Indicator Regulator, and Delivery Jet.....	\$50.00
2889. Gas Regulation Burner.....	5.00
3572. Ditto, Regulator, Kemp's, ordinary.....	3.50
2413. Ditto, with Bunsen's new improvement.....	4.00
2407. Gas Tubes, registered in cubic Centimeters.....	\$1.25 to 2.50
2418. Ditto, 5 cubic inches, in tenths, each.....	1.75
2417, '18. Ditto, or Absorption Tubes, lipped, in Millimeters.....	\$1.75 to 2.50
1407. Ditto, Syphon Barometer, engraved scale, with support.....	15.00
3572. Apparatus , for the Determination of Sulphur by Chlorine..	7.50
3573. Ditto, for preparing Nitrogen by Chlorine and Ammonia, consisting of Glass Flask, Receiver, Delivery Tubes, Support and Burner.....	\$7.50
3574. Ditto, for the Determination of Nitrogen, after Dumas.....	15.00
3575. Ditto, for preparing Nitrous Oxide, consisting of Gas-burner or Lamp, Woulff's Bottle, Gallows Screw Connector, fitted with Mouth-piece and Stop-cock, bent Tube with Connector, Pint Retort and Receiver, and Lamp Stand of iron.....	\$12.00
3576. Ditto, for combining the Gases requisite for forming Exhilarating Gas, consisting of Bell and Receiver, each with ground edges, between which is placed a Plate of Glass, ground on both sides.....	\$2.50
3577. Ditto, for generating Chlorine Gas, consisting of Lamp, Pneumatic Cistern, Iron Stand, Flask, Sand Bath, etc.....	\$10.00
3578. Ditto, Deflagrating, for making Anhydrous Phosphoric Acid by burning Phosphorus in Oxygen.....	\$3.50
3579. Ditto, consisting of Carboys of Earthenware, with Filter for generating Chlorine.	

- 3580.** Apparatus for preparing Nitrogen by burning Phosphorus in air, \$3.50
3581. Ditto, to illustrate the Diffusion of Gas..... 2.00
 2189. Ditto, for showing Endosmosis..... 1.50
3582. Ditto, to illustrate the Formation of Chloride of Ammonia by condensing the vapors of Hydrochloric Acid and Ammonia, consisting of a Glass Flask holding one gallon, to which are attached two Tubes by means of an India Rubber Connection.....\$2.50
3583. Ditto, for making Chloride of Sulphur, consisting of two tubulated Receivers, Chloride of Calcium Tube, Bulb Tube, Gas Flask, etc., after Mitscherlich.....\$7.00
3584. Ditto, Mohr's Ether Extraction.....\$8.00
 (See also list of Hoffman's Apparatus.)
3585. Ditto, Bunsen's, for obtaining pure Hydrogen Gas..... 6.50

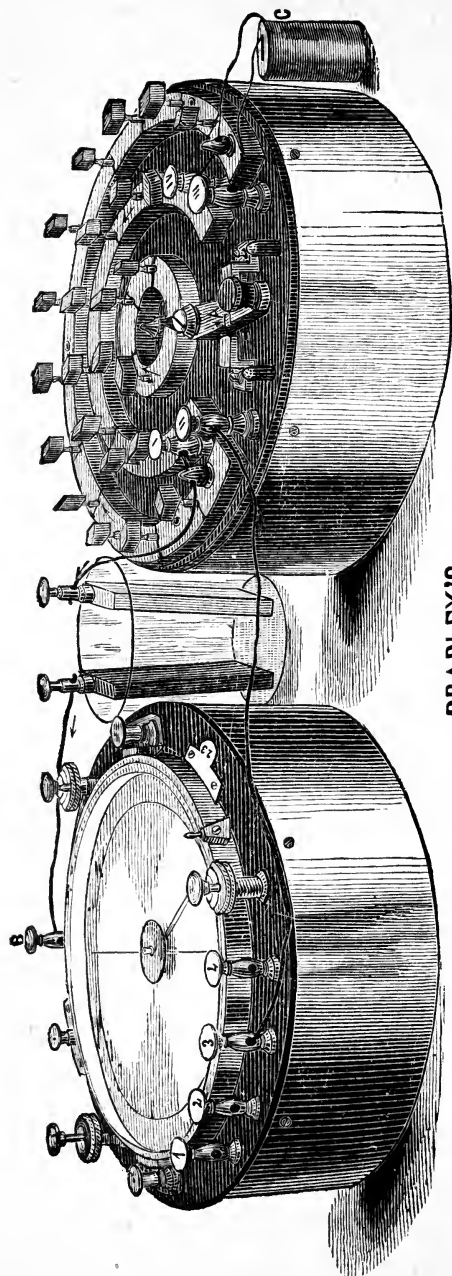


3585



3586

- 3586.** Ditto, ditto, for obtaining pure Oxhydrogen by the Decomposition of Water.....\$6.50
 2419. Porcelain Apparatus, for Washing Gases, consisting of two deep Porcelain Dishes, fitting into each other with concentric Chambers, Receiver and Vent.....\$5.00
 3463. Woulff's Apparatus, for Washing Gases, 8 oz..... 5.50
 " Ditto, ditto, ditto, ditto, ditto, pints..... 7.00
 " Ditto, ditto, ditto, ditto, ditto, quarts..... 8.00
 1602. Lamps, suitable for the above, each..... 1.25
 3239. Iron Support for ditto..... 1.50
 1731. Apparatus, for Generating Chlorine, Safety Funnel and Delivery Tube, Quart Flask.....\$1.35
 2396, '97. Ditto, for Sulphuretted Hydrogen, large size, 2 Bulbs, Kipp's, \$6.00 to 7.50
 2401. Ditto, ditto, smaller, Babo's..... \$1.00
 2194. Ditto, for the Extraction of Ether, 1 gal.....\$14.00
 2022. Ditto, for Displacement, after Guibourg.....\$12.00
 2019. Ditto, for the Extraction of Ether, small, or Displacement Apparatus......75
 3406. Bottles for Washing Precipitates, Faraday's pints......50
 " Ditto, ditto, ditto, ditto, quarts......75
 2233. Evolution Flask, complete.....\$1.25
 Gas Bottles, with Receiving and Delivery Tube......75
 2402. Hydrogen Generators.....\$5.00 to 40.00
 2405. Oxygen ditto, quarts.....\$4.50
 " Ditto, ditto, $\frac{1}{2}$ gal..... 6.00
 2407. Pepy's Gas Holder, of Copper, 10 gals.....27.50
 " Ditto, ditto, ditto, ditto, 15 gals.....37.50
 2406. Ditto, ditto, Japanned Zinc, 10 gals.....22.50
 " Ditto, ditto, ditto, ditto, 15 gals.....27.50



**BRADLEY'S
APPARATUS FOR
ELECTRIC MEASUREMENT.**

3570

3570. Bradley's Apparatus for Electric Measurement, for accurately determining the electro-motive force, resistance and strength of batteries. For directly measuring the resistance of all conductors of electricity, telegraph wires, etc., from the $\frac{1}{1000}$ of an ohm to $\frac{1}{100}$ ohms. For determining the insulation resistance of telegraph lines up to millions of ohms. For locating breaks, faults and crosses on telegraph lines, cables, etc. For determining the quantity of metal of any kind deposited in a given time in the process of electroplating, gilding, etc.

For determining the specific conductivity of metals, especially of copper, a matter of great importance to those manufacturing or using wire for telegraphic or other electrical purposes, and in short, the capacities of all other instruments for similar purposes combined are embraced in this one, in a substantial and compact form, convenient for transportation, and comparatively safe from injury. Its operations are exceedingly exact, and in no wise complicated or difficult. Descriptive Pamphlets may be had on application.

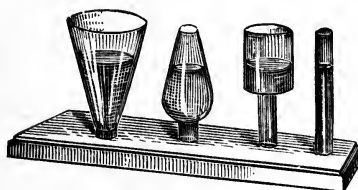
Price, each, \$200

APPARATUS FOR HEAT.

3587. Apparatus, for showing Specific Heat.....	\$5.00
1828. Conductometer.....	2.50
3588. Apparatus to show Spheroidal State of Liquids, as per No. 52 of Tyndall, on Heat.....	\$2.00
3589. Trevelyan Rocker, according to Tyndall, Fig. 27.....	6.00
3590. Straight Roller, Electrical, according to Tyndall, Fig. 30.....	8.00
3591. Elliptical Roller, according to Tyndall, Fig. 31.....	10.00
3592. Apparatus, to show Influence of Pressure at Boiling Point, Fig. 35.....	\$8.00
3593. Ditto, showing Development of Heat by Compression of Air, Fig. 13.....	\$4.00
1779. Bunsen's Furnace, for Organic Combustion, imported, 25 Burners.....	60.00
1780. Ditto, domestic, 25 Burners.....	50.00
3594. Ditto, 18 Burners.....	40.00
1781. Ditto, 10 Burners.....	30.00
3595. Sefstrom's Chemist's Forge, imported to order.....	175.00
1476. Blow-table and Blast-pipes.....	40.00
1778. Liebig's Combination Furnace, 24 in., \$3.25; 18 in.....	2.25
1809. Ditto, Condensers, Glass, small.....	1.00
1811. Ditto, ditto, Japanned Tin.....	3.50
1812. Ditto, ditto, Brass, soldered.....	6.50
1813. Ditto, ditto, ditto, brazed.....	10.00



3599



3603



3605

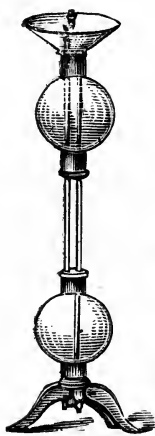
3596. Carré's Ice Freezer, imported to order.....	150.00
2992. Pulse Glasses, carefully packed in pasteboard case, each.....	.50
2190. Eolipile, or Ether Jet.....	.50
3597. Parabolic Reflectors, with Iron Balls, Support and Stand of Brass, 10 in.....	\$12.00
2878. Ditto, ditto, ditto, ditto, 13 in.....	16.00
" Ditto, ditto, ditto, ditto, 15 in.....	25.00
2879. Ditto, ditto, ditto, ditto, nickelized, 10 in.....	15.00
" Ditto, ditto, ditto, ditto, ditto, 13 in.....	19.00
" Ditto, ditto, ditto, ditto, ditto, 15 in.....	28.00
The Nickelized Reflectors are not easily corroded, and retain their polish.	
2529. Psychrometer, August's, wet and dry bulb, mounted.....	\$12.00
3304. Differential Thermometers, Leslie's, each.....	2.50
3598. Radiator, Leslie's, each.....	2.50
3004. Pyrometer, Three Metals, ordinary.....	6.00
3005. Ditto, ditto, ditto, extra fine, with Brass Revolving Alcohol Holder.....	\$12.00
3599. Brass Ball and Gauge Ring, wooden handle, showing Expansion and Contraction, per pair.....	\$3.25
1808. Compound Bar, showing Unequal Expansion.....	1.00

APPARATUS FOR HEAT.—*Continued.*

1827. Apparatus, for showing the slow Conduction of Heat downwards by Fluids.....	\$2.50
2268. Glass Fire Syringe, with Tinder, 10 in. long.....	8.00
1347. Flameless Lamp.....	1.50
1960. Davy's Safety Lamp, for Miners, etc.....	7.50
2422. Wire Gauze, in frame.....	.75
1912. Cryophorus, Wollaston's, double bulb.....	2.00
1913. Ditto, ditto, single bulb.....	1.75
2527, '28. Hygrometers, Saussure's.....	\$4.00, 8.00 and 12.00
2526. Ditto, Mason's.....	4.56
3306. Maximum and Minimum Thermometers.....	4.00
3310. Metallic Thermometers, Watch Form.....	20.00
1290. Air ditto.....	.25
3415. Water Hammers.....	.75
2563. Brass Jets, for Burning Gases.....	.50
2564. Ditto, ditto, with Stop-cock and Flat Tip.....	2.00
1791. Combustion Tubes.....	.40 to .50
3306. Day and Night Thermometers.....	4.00
1477, '79, '80, '81. Oxhydrogen Jets.....	\$4.00, 10.00, 15.00 and 20.00 each.
1649. Candle Bombs, per doz.....	.30
3600. Hygrodeik, Edson's, for ascertaining the sensible Temperature due to Evaporation, the actual Humidity, Dew Point and absolute amount of Moisture.....	\$15.00

APPARATUS for HYDRAULICS AND HYDROSTATICS.

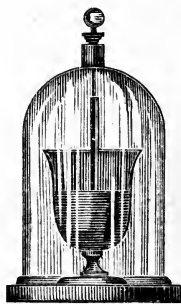
3601. Model of Forcing Pump, complete.....	\$20.00
3254. Tantalus Cup.....	2.00



2098



3606



3619



3620



3629

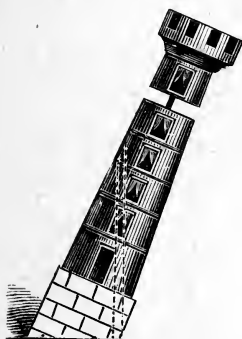
3602. Archimedes Screw.....	5.00
3603. Equilibrium Tubes, a set of 6.....	3.50
2098. Hiero's Fountain, of Glass.....	18.00
3604. Barker's Mill, plain.....	6.00
3605. Ditto, ditto, with Stop-cock.....	10.00
1686. Hydrometer Jar, with Balloon Car.....	1.50 to 5.00
2524. Nicholson's Hydrometer.....	6.00
3606. Archimedes principle, Brass Cup and Cylinder.....	3.50 to 6.50
2461, 2520 Hydrometers, various.....	.75 to 2.00
2544, '44. Ditto, Jar, Glass Foot, with or without Lip.....	1.00 to 2.00
— Specific Gravity Balance.....	15.00 to 20.00

APPARATUS FOR HYDRAULICS AND HYDROSTATICS.—*Continued.*

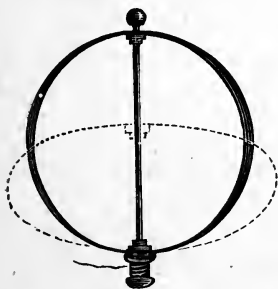
1684. Cartesian Imps .....	.20 to \$1.50
3247. Glass Syphons .....	.50 to 1.50
3607. Wurtemberg Syphons	1.00
3608. Diving Bell	6.50
2994. Forcing Pump, of Glass	1.50
2993. Lifting Pump, of "	1.50
1656. Capillary Tubes and Pan	2.00
1654. Ditto, Plates, with Pan, to show the Parabolic Curve	2.00
3609. Apparatus for showing the Principle of Archimedes Screw, consisting of Archimedes' Screw, mounted on Wheels. When the Rod holding the Screw is swiftly revolved, the machine will be propelled	\$10.00

APPARATUS FOR MAGNETISM.

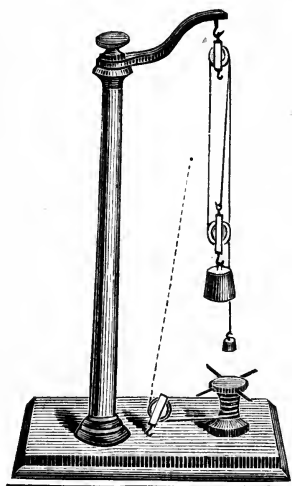
3610. Electro Magnet	2.50
3611. Ditto, ditto, on Stand, to lift Weights	16.00
2126. Ditto, ditto, Revolving, Page's	8.00



3622



2624



3625a



3632

3612. Circular Magnets, with Ring	4.75
3613. Helix on Stand	4.50
3614. Contracting Helix	6.00
3615. Voltaic Pistol	4.00
2647. Horse-Shoe Magnets, 3 in .....	.30
" Ditto, ditto, ditto, 3½ in .....	.60
" Ditto, ditto, ditto, 4 in .....	.75
" Ditto, ditto, ditto, 6 in	1.25
" Ditto, ditto, ditto, 10 in	4.50
Ditto, ditto, ditto, compound	4.00

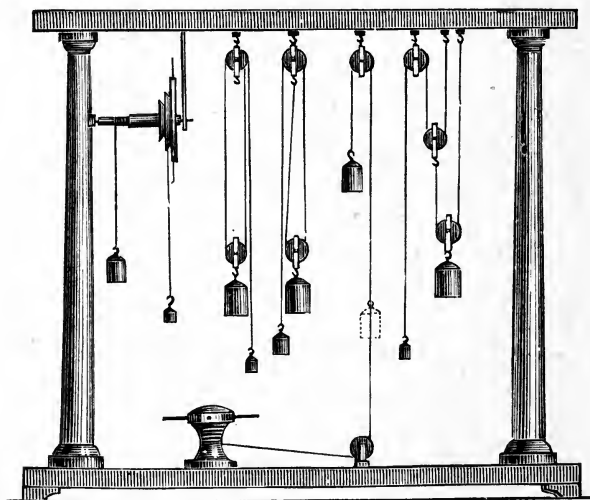
APPARATUS FOR MAGNETISM.—*Continued.*

2646. Magnets, Single Bar	\$1.00
2649. Ditto, Pair, with Armature	3.50
3616. Ditto, ditto, ditto, Wheel Armature	3.25
2650, 1800. Magnetic Needle, on Stand	\$1.75 to 2.50
2651. Dipping Needle	2.00
3617. Adhesion Plates	1.50
3618. Lodestone, according to size .....	.50 and upwards.
3619. Gassiot's Cascade	\$2.50

(See also Electricity, in regular Catalogue, under E.)

APPARATUS FOR MECHANICS, Made only to Order.

3620. Inertia Apparatus	\$2.50
1772 Collision Balls, Lignumvitæ, set of 5	3.50
3621. Centre of Gravity, set of 8	11.00
3622. Leaning Tower	1.25
3623. Whirling Table and Accessories	33.00
3624. Centrifugal Forces, per set	12.00
3625. Illustration of Weights and Pulleys	33.00



3625

3626. Screw on Mahogany Frame	6.00
3627. Sets of Solids	5.00
3628. Dissected Cone	2.50
3629. Gyroscope	8.00
3630. Atwood's Falling Machine	\$75.00 to 150.00
3631. Apparatus, Brass, showing the principle of the Reveral Balance.	\$15.00
3632. Inclined Plane	4.00

OPTICAL APPARATUS.

2168. Duboscq's Electric Lamp	\$400.00
2169. Serrin's, ditto, ditto	450.00
2640. Magic Lantern, German	25.00
2639. Ditto, ditto French, each	\$6.00, 10.00 and 25.00

OPTICAL APPARATUS.—*Continued.*

3633. Illustrations on Glass, for Magic Lanterns (Fancy Illustrations), per set.....	\$5.00 to 10 00
3634. Electric Lamp, by clock-work, made to order.....	\$150.00
3635. Ditto, Lantern.....	50.00
2607. Magnesium ditto.....	25.00
2608, 2612. Oxhydrogen Calcium Light.....	\$7.50 to 25.00
2613. Carbon Points, mounted.....	20.00
3636. Ditto, ditto, ditto, with Reflector.....	25.00
3637. Ditto, ditto, ditto, in Lantern.....	27.50
3638. Ditto, ditto, without Lenses and small Reflector.....	30.00
1679. Ditto, Pencils, per inch.....	.06
3639. Spectroscopes, Duboscq's, imported to order.....	210.00
3139. Ditto, Browning's, 2 Prisms.....	160.00
3138. Ditto, Heildelberg, single Prism, with 2 Lamps, 2 Holders, 12 Platina Ends.....	\$65.00
3136, '37. Ditto, Browning's, Hand.....	\$15.00 to 18.00
1728. Charts, showing the Spectra of Metals and Stars, translated into English, each.....	\$3.50
3257. Merk's Telescope, High Power, with Strap for mounting on Stand.....	\$30.00
2681. Gundlach's Microscope, 2 Eye-pieces, 5 Objectives, with Slides, etc., all in an elegant, highly polished case; a very superior article, complete.....	\$200.00
2680. Nacht's Compound Microscope, French.....	20.00
2678. Ditto, ditto, ditto, ditto.....	15.00
2682. Accurate Solar Microscope, complete, in fine box, hinged Cover, etc.....	\$200.00
1768. Collection of Rare Specimens, for Spectral Analysis, with Platinum Wires on Glass Foot, and Stands to hold them, with Sliding Box.....	\$7.50
2630. Watchmakers' Lenses.....	2.50
1769. Collection of Objects, for Solar Microscope, mounted.....	25.00
1871. Microscopic Covers, Circles, very thin, per ounce.....	4.00
1872. Ditto, ditto, Squares, per ounce.....	3.00
2687. Ditto, Slides, assorted, per doz.....	.50
2629. Camera Lens, or Asplanat, by Steinheil.....	30.00
2976. Set of 3 Hollow Prisms, mounted on Stand.....	30.00
3640. Ditto, Acromatic ditto, ditto, ditto.....	30.00
3641. Single Rectangular, ditto, ditto.....	16.00
2973. Bottle Prisms.....	\$6.00 to 12.00
2988. Equilateral ditto, 35x33 N. Y. in., each.....	5.00
2983. Acromatic ditto, 30x27 N. Y. in., per pair.....	5.00
2984. Ditto, ditto, 35x32 N. Y. in., per pair.....	6.00
2985. Ditto, ditto, 40x36 N. Y. in.....	7.25
2986. Ditto, ditto, 45x45 N. Y. in.....	9.00
2981. Prisms, for Dark Chambers, 15 Lines, each.....	2.00
2982. Ditto, ditto, ditto, ditto, 21 Lines, each.....	2.50
2974. Elegant Hollow Prism, Bisulphide of Carbon Prism, all the Joints fitted exactly, without flaw, blister or striated lines; a valuable gem for a Cabinet, and made by the celebrated Dr. Steinheil, of Munich.....	\$50.00
2959. Polarization Apparatus, Mitscherlich's, with Extra Tube.....	60.00
3642. Model of the Human Eye, showing the Motion.....	2.50
2234. Eye Model, showing the Reflection on the Eye Lens, with the use of Spectacles.....	\$15.00
2621. Magnifying Lenses, for Assayers.....	2.50
2631. Set of Glass Lenses, 6, for Demonstrations.....	2.50
3643. Mirrors, Convex and Concave.....	2.75
2632. Apparatus, for Defraction of Light.....	7.50
2810. Ditto, for showing Monochromatic Light, 5 Burners.....	12.00
3109. Ditto, Hoffman's, for Inverting the Soda Flame.....	\$3.00 to 3.50
3644. Ditto, for showing the Oxidation of the Soda Flame.....	2.00
3645. Ditto, Hoffman's Flame Apparatus, with Argand Burner.....	5.00
2622. Lenses, Coddington.....	2.25 to 2.50
2623, '24, '25. Ditto, Stanhope, German Silver.....	2.00 to 3.50

OPTICAL APPARATUS.—*Continued.*

2526. Loups, single, 9 lines, .75; 11 lines, \$1.00.	
2627. Ditto, double.....	\$1.25 to 1.50
2628. Ditto, triple.....	1.50 to 1.75
2633. Apparatus, for the Recomposition of Light.....	2.50
2676. Microscopes, No. 1, Universal Joint.....	7.50
2677. Ditto, No. 3.....	10.00
2678. Ditto, No. 4.....	15.00
2679. Ditto, No. 1, in two columns, etc.....	25.00
3144, '45. Lantern, Browning's, for projecting Spectra on the Screen.	\$50.00 to 150.00

APPARATUS FOR ORGANIC ANALYSIS.

2948. Air Pump Plate, 7½ in.....	\$25.00
1362. Aspirator, the same as used in Apparatus 1352, on p. 15.....	1.50 to 2.50
1360 to 1362. Aspirator, glass.....	2.00 to 3.00
1365. Aspirator Tubes.....	.50
3646. Complete set of Apparatus for Organic Analysis, according to Liebig.....	\$45.00
1714 to 1720. Chloride of Calcium Tubes.....	.15 to .60
1776. Combustion Boats, porcelain.....	.20 to .50
2926. Ditto, ditto, Platinum, per grain.....	.03
2375. Ditto, Furnaces, Bunsen's gas.....	60.00
1780. Ditto, ditto, American gas.....	50.00
1781. Ditto, ditto, French gas.....	30.00
1782 to 1786. Ditto, ditto, to be used with Kerosene.....	12.00 to 40.00
1777. Ditto, ditto, Storer's.....	1.50
1778. Ditto, ditto, Liebig's Charcoal.....	2.50 to 3.00
1789. Ditto, ditto, Foil, of Copper, per ounce.....	.05
1791. Combustion Tubing.....	.40 to .50
1792. Ditto, ditto, for Nitrogen determination.....	.35 to .45
— Copper Turnings (see Chemicals), per lb.....	1.00
2423. Ditto, Gauze, per sq. ft.....	.85
2050. Drying Baths.....	2.50
2061, '62. Drying Tubes, Liebig's.....	.50 to .60
2343. Filling Tubes.....	.50
2417, '18. Graduated Tubes for Nitrogen determination.....	1.25 to 2.50
2416. Glass Tubes, for weighing substances to be analyzed, per doz....	2.00
3387. India Rubber Tubing, ½ in. bore, per ft.....	.10
2664. Mercury Jar, of glass.....	1.00 to 2.00
2670. Ditto, Trough, Porcelain, to hold 5 lbs. of Mercury.....	1.00
2671. Ditto, ditto, ditto, 16 lbs. ditto.....	2.00
2853. Nitrogen Bulbs, Horsford's.....	.75
3647. Ditto, ditto, Simpson's.....	1.00
2968. Potash Bulbs, Geisler's or Mohr's.....	1.00
2966. Ditto, ditto, Liebig's.....	.75
2969. Ditto, Pipettes.....	.50
2343. Suction Tubes.....	.50
3239. Wood Supports.....	1.50

CHEMICALS.

Black Oxide of Copper.
 Chromate of Lead, pure fused
 Soda Lime.
 Bichromate of Potash, cryst.
 Caustic Potash.
 Chloride of Calcium, crude, dry.

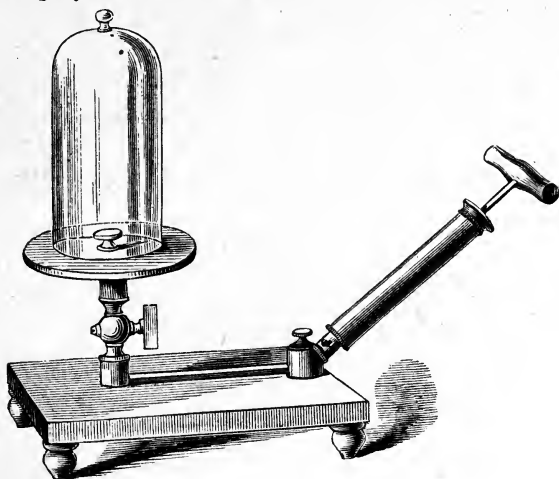
Chloride of Calcium, fused.
 Chlorate of Potash, cryst.
 Copper, in fine strips.
 Ditto, Turnings.
 Asbestos, long fibre.

APPARATUS FOR PNEUMATICS.

2946. Air Pumps, large and powerful.....	\$100.00
2951. Ditto, ditto, Mischterlich's.....	10.00
2950. Ditto, ditto, ditto, mounted.....	15.00

APPARATUS FOR PNEUMATICS.—*Continued.*

2952. Air Pumps, Liebig's, Brass Cock	\$15.00
2948. Ditto, ditto, with Plate and strong Clamp to attach to a Table in place of Mahogany base	\$20.00



2948

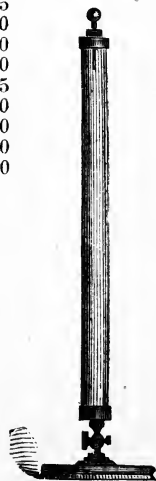
2948. Air Pumps, mounted on a fine polished Mahogany base, with heavy ground glass Plate.....\$25.00

The more costly grades of Air Pumps can be furnished, when desired, of first-class workmanship.

1443. Swelled Glass Receivers, with knob, $\frac{1}{2}$ gal. \$1.50, 1 gal. 2.00, 2 gal. 3.00	
1444. Ditto, ditto, ditto, open tops, $\frac{1}{2}$ " 1.75, 1 " 2.50, 2 " 3.50	
1449. Plain ditto, ditto, .....quarts, 75 cts, $\frac{1}{2}$ " 1.00, 1 " 1.50	
1446. Ditto, ditto, ditto, tall, with knobs, " 75 " $\frac{1}{2}$ " 1.00, 1 " 1.50	
1442. Ditto, ditto, ditto, flat, ditto, 6 in. \$1.25, 8 in. 1.75	
3648. Receiver, with sliding Rod, Hook and Ball..... 5.00	
Ditto, the Cap and Stop-cock fitted, extra..... 2.00	
3416. Water Hammer..... 1.00	
2555. Bladder and Hand Glass..... .75 to 1.25	
3649. Magdeburg Hemispheres .....\$7.00 to 10.00	
3650. Bolt Head Experiments..... 4.00	
3651. Mercury Shower..... 3.00	
1289. Air Balloons, glass, for weighing Air, 1 gal..... 1.00	
1405. Ditto, ditto, rubber and Gold-beater's, 2 gal..... \$1.50 to 5.00	
Ditto, ditto. See Balloons.	
3338. Torricellian Experiments. \$4.50	
3652. Guinea and Feather Tube, \$8.00 to 10.00	
3653. Bell, in Vacuo 4.00	
1684. Cartesian Imps, singly, from .25 to 1.00	
1686. Ditto, ditto, in Bottles, from \$1.50 to 1.75	
3654. Model, Hydrostatic Press, \$20.00	
2459. Hydroclyse, or Forcing Pump, producing a constant stream of water, enclosed in a fine polished Velvet-lined Case..... \$4.00	



3649



3652

APPARATUS FOR PNEUMATICS.—*Continued.*

2460. The foregoing can also be used as a Syringe, supplied with Male and Female Joints, in fine polished Velvet-lined Cases \$5.00
The above is the best form of Injecting Syringe known, as its Valves and all its appurtenances are all Metallic.

3655. Hydrostatic Balance	\$10.00
3656. Apparatus, for upward and downward Pressure.....	14.00
3657. Barometer Apparatus.....	6.00
1822. Apparatus for Air Cylinder.....	12.00
2316. Freezing Apparatus.....	\$3.50 to 6 00
1912. Cryophorus.....	2.00
1648. Bursting Squares, per doz.....	2.50
3658. Apparatus, for illustration of Marriotte's Laws.....	10.00
2904. Bubble Pipe, for Gas.....	.75
2313. Fountain, in Vacuo.....	9.00
2953. '54, '55. Pneumatic Trough, Japanned, 12 in. 3.00, 15 in. 3 50, 16 in. 4.50	
2956. Ditto, ditto, Glass, solid, 12x5 in	4.50 to 8.00
— Ditto, ditto, with Brass Sliding Shelf.....	1.00
2957. Ditto, Turning Corners, very stout, 12x6 in.....	7.00
2958. Ditto, ditto, ditto, ditto, 14x7 in.....	8.50
— Ditto, ditto, Porcelain, for use with Mercury. See Mercury Troughs.	
1441. Bee-Hive Shelves, Porcelain, small.....	.25
“ Ditto, ditto, large.....	.75
“ Ditto, ditto, ditto, Earthen.....	.25
Fittings. See Stop-cocks, etc.	

3659. APPARATUS, recommended by Dr. Scheibler and others,
for the Analysis of **SUGAR, SYRUPS, etc.**

1257. Apparatus for determining the quantity of Carbonic Acid in Bone Ash, accompanied with instructions, bottles, etc., corrected by Dr. Scheibler, \$35.00

1259. Dr. Scheibler's New Apparatus, for Quantitative Volumetric Analysis of Carbonic Acid \$45.00

1313. Salleron's Alembic, for Testing the percentage of Alcohol in Saccharine Solutions \$25.00

1374. Balance for Specific Gravity, sensible to $\frac{1}{10}$ of a millogramme.....	77.00
1376. Ditto, ditto, for 200 grammes	107.00
1648a. Colorimeter, for the examination of Sugar and Syrups.....	
1949. Mixing Cylinders.....	1.30 to 4.50
2044. Drying Baths	15.00
2205 to 2230. Evaporating Dishes .....	.20 and upwards.
2495 to 2499. Saccharometers.....	75 to 2.50
2500. Ditto, according to Dr. Scheibler.....	15.00
2635. Centimeter bottles, stoppered.....	.35 to 1.60
2636. Ditto, not stoppered .....	.25 to 1.00
2637. Ditto, with two marks on the neck .....	.60 to 1.25
2692. Mixing Bottles.....	2.50 to 3.50
2959. Saccharimeters, or Polarization Apparatus, Mitscherlich	60.00
2960. Ditto, Wild's, in Mahogany Case.....	175.00
2961. Ditto, Soleil	150.00
2962. Ditto, Soleil-ventzke	225.00

APPARATUS FOR WATER ANALYSIS, ETC.

3660. Apparatus for the Decomposition of Water, mounted on stand, \$2.50

3661. Ditto, ditto, ditto, with cup complete, according to Faraday.. 5.00

3662. Ditto, ditto, ditto, unmounted, Hoffman's..... 6.50

3663. Ditto, ditto, ditto, mounted 10.00 |

3664. Ditto, for the Determination of Water and Carbonic Acid in the atmosphere, after Fresenius

3665. Ditto, for the Analysis of Mineral Waters, by Fresenius..... 10.00

APPARATUS FOR WATER ANALYSIS, ETC.—*Continued.*

2443. Bunsen's Apparatus, for Rapid Filtration	\$11.00
3666 Ditto, set usually employed, including Flasks, Funnels, Mould Holder and Cone	18.00
2247. Support of Japanned Tin for Bunsen's Apparatus	3.00
2252. Flasks, for Filtering, extra heavy glass, wide mouths, 16 oz. ....	.40
“ Ditto, ditto, ditto, 24 oz. ....	.50
“ Ditto, ditto, ditto, 32 oz. ....	.60
2319. Funnels, prepared expressly, and ground to an exact angle of 60 deg. on Moulds made for the purpose, 1½ in. ....	.15
“ Ditto, ditto, ditto, 2 in. ....	.20
“ Ditto, ditto, ditto, 3 in. ....	.30
“ Ditto, ditto, ditto, 4 in. ....	.40
“ Mould and Holder for preparing the Cone .....	.50
1830. Platinum Cone, for Supporting the Filter, price according to weight, per grain, about .....	.75

VARIOUS FORMS OF APPARATUS,

ACCOMPANIED WITH

ACCURATE DRAWINGS AND SPECIFICATIONS,

MAY BE MADE

SPECIALLY TO ORDER,

EITHER IN

GLASS, BRASS, OR WOOD.

ORDERS ALSO FOR

TECHNICAL AND TEXT BOOKS,

WILL BE

EXECUTED PROMPTLY,

AND

PACKED WITH GOODS IN MY LINE, WITHOUT EXTRA CHARGE.

3667

Dr. SQUIBBS'

NEWLY INVENTED

UNIVERSAL LABORATORY SUPPORT,

Adapted to sustain Tubes of any size, up to 3 inches. Price, \$2.50

This SUPPORT supplies a want long experienced in the Laboratory, in substituting a single Apparatus for several varieties.

3668.—RELATIVE VALUE OF VARIOUS WEIGHTS AND MEASURES.

TROY AND AVOIRDUPOIS WEIGHTS.

Pounds.	Pounds.	Pounds.	Ounces.	Grains.
1 Troy = 0.822857	Avoir. = 0		13	72.5
1 Avoir. = 1.215277	Troy = 1		2	28.0

3669.—RELATIVE VALUE OF TROY AND FRENCH WEIGHTS.

TROY.

Millegramme = .0154 grs.

Centigramme = .1543

Decigramme = 1.5434

Gramme = 15.4340

Decigramme = 154.3402 = 0 0 2 34.3

Hectogramme = 1543.4023 = 0 3 1 43.4

Kilogramme = 15434.0234 = 2 8 1 14.

Myriagramme = 154340.2344 = 26 9 4 20.

3670.—The French Metre, or Unity of Length, at temperature of 32 deg. Cel. = 39.371 Eng. inch, at 62 deg. Fah.

The French Litre, or Unity of Capacity, at same temperature. = 61.028 Eng. cubic inches.

The French Gramme, or Unity of Weights, at same temperature, = 15.434 Eng. Troy grs.

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